THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
December 26, 1988/ January 2, 1989 · Vol. XXII · No. 52 · 100 Pages · $2/ Copy · $44/ Year

COMPUTERWORLD

FORECAST '89

Blueprints for Leadership

INSIDE

Smaller is Better
Companies use LANs to shrink computing costs. Page 23.

Too Much To Take?
MIS views new PCs with skepticism. Page 41.

Revolutionary? Maybe
CASE overcomes early hurdles but faces more. Page 45.

SECOND CLASS MAIL

NEWSPAPER

Managers in

#63D#KKKKKKKKKKK 5-DIGIT 48106
#BOW2ZE300J069061# 012
JOYCE BROWN
UNIV MICROFILMS INTERNATL
300 N ZEEB RD
ANN ARBOR, MI 48106

THERE'S A WORLD OF DIFFERENCE BETWEEN US AND OTHER COMPUTER SERVICES AND SOFTWARE COMPANIES.

We're Computer Power Group. And we're different than any other computer services and software company. First of all, we're a global, entrepreneurial organization with a network of 2,500 full-time professionals in 80 cities on four continents. Many know us by the names of the divisions shown above.

Secondly, we're the *only* computer services and software company specializing in *all* seven of the disciplines that comprise software services: professional services, systems integration, professional and technical resources, education and training, software maintenance services, network and operations management, and applications software packages and productivity tools.

In addition, these seven services all share access to a state-of-the-art delivery system we call TDSS: Technologies for the Delivery of Software and Services. TDSS consists of both proprietary and off-the-shelf software tools and service methodologies that can be applied to all the projects we undertake.

Our professionals help you evaluate and select the right combination of hardware, software, applications, and network technology. What's more, our evaluation, design, and implementation skills, coupled with our ability to take complete project responsibility, enable us to help meet your business needs on time, to budget, to specification.

With our global presence, complete range of services, proven delivery systems, and a focus on making the customer successful, we have a long list of satisfied customers throughout the world.

To find out how Computer Power Group can make a world of difference to your next project, call (508) 650-3500. Or write: Computer Power Group, Americas, 24 Prime Park Way, Natick, MA 01760.

COMPUTER POWER GROUP

COMPUTERWORLD

Forecast Editors
Michael L. Sullivan-Trainor
Deborah Fickling

Editor in Chief
Bill Laberis
Executive Editor
Paul Gillin

News Editor
Peter Bartolik

Technical Editor
Charles Babcock

Senior Editors
James Connolly, Management
Clinton Wilder, Industry
Elisabeth Horwitt, Networking
Patricia Keefe, Networking
Douglas Barney, Microcomputing
Stanley Gibson, Software
Michael Alexander, Microcomputing
Rosemary Hamilton, Systems

Senior Writers
Nell Margolis
Alan J. Ryan
Amy Cortese
William Brandel

Staff Writer
James Daly

New Products Writer
Sally Cusack

Features Editor
George Harrar

Senior Editors
Glenn Rifkin
Joanne Kelleher, Spotlight and Executive Report

Senior Writer
David A. Ludlum

Associate Editor
Kelly Shea

Assistant Editor
Sharon Baker

Researcher
Bonnie MacKell
Assistant Researcher
Kevin Burden

Chief Copy Editor
Steven M. Ulfelder

Assistant Chief Copy Editor
Mary Grover

Features Copy Editors
Julie L. Cook
Joseph J. Patton

Copy Editors
Cathleen A. Duffy
Richard R. Pastore
Donald St. John
Joyce Chutchian

Art Director
Nancy Kowal

Graphics Specialists
Frank C. O'Connell
John B. York

Graphics Researcher
Laura O'Connell

Graphic Designer
F. Charles Lalonzeur

Assistant to the Editor in Chief
Linda Gargano
Editorial Assistants
Patricia Faherty
Lorraine Witzell
Megan Santosus

Rights and Permissions Manager
Nancy Shannon

News Bureaus
Mid-Atlantic
201/987-1350

Robert Moran, Correspondent

Washington, D.C.
202/347-6718

Mitch Betts, Bureau Chief

West Coast
415/347-0555

Julie Pitta, Senior Correspondent
J.A. Savage, Correspondent
Mary Ellison, Editorial Assistant

Midwest
312/827-4433

Jean S. Bozman, Bureau Chief

IDG News Service
Kathleen A. Gow, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
508/879-0700

Cover art by Mick Wiggins

IN THIS ISSUE

This is the house that IS built. With the end of the decade approaching, the facade is more attractive than ever — but in 1989, how will the superstructure hold up?

FOUNDATION

2 **Budget process a toss-up** By James Daly and Robert Moran

4 **IBM's Terry Lautenbach**

6 **Clearing the obstacles for CIM** By Elisabeth Horwitt

10 **High-tech prepares for the Bush years** By Mitch Betts

12 **Rockwell's James Sutter**

16 **Dubious distinctions**

FRAMEWORK

19 **Beware of selling IS out of house** By Clinton Wilder

20 **Index Group's Thomas Gerrity**

23 **Downsizing an opportunity and risk** By Michael Alexander

25 **Integrated net management: a Pandora's box** By Patricia Keefe

INTERIOR

29 **CIOs' lives are turned topsy-turvy** By James Connolly

30 **Banc One's David Van Lear**

31 **What's your mandate?** By Alan J. Ryan

35 **RISC: Sweet music or just so much noise?** By Stan Kolodziej

36 **Managers wait for RISC benefits** By Rosemary Hamilton

37 **Sun's Scott McNealy**

39 **The net manager's apprentice** By Jean S. Bozman

LANDSCAPE

41 **Fast speeds, slow expectations** By William Brandel

44 **PCs not yet part of CAD set** By Julie Pitta

45 **CASE fights to beat 'all talk, no action' image** By Nell Margolis

46 **Unisys' W. Michael Blumenthal**

53 **1989 will be the year of DB2's coming-out party** By Amy Cortese

55 **MIS-consultant relationship more faith than fact** By Mark Breibart

56 **Alliance fever makes for strange bedfellows** By Douglas Barney

60 **Kloogel** By Glenn Rifkin

SYSTEMS & SOFTWARE

63 AI creeps into real-world applications.

63 DEC, IBM learn to love each other's tape drives.

MICROCOMPUTING

67 Will flexible disks bump tape off PCs' dance cards?

67 Now you can look at the big spreadsheet picture.

NETWORKING

69 AT&T sees data net future in PBXs, ISDN.

69 Plant-floor mavens seek to zap code.

MANAGEMENT

71 Playboy's DP director strips operation down.

71 Baptism by fire for new Hancock IS chief.

COMPUTER INDUSTRY

73 No check in the mail for Perot Systems.

73 Holy *kanban*! Ricoh research exec joins Japan's boys in the boardroom.

COMPUTER CAREERS

82 The IS gold rush is over, but you'll get your share of green in '89.

OPINION & ANALYSIS

63 Coleman tells his side of the normalization story.

67 Barney charts the waters for whale-watchers.

71 Zawacki checks off a downsizing wish list . . .

73 . . . and Wilder clocks in with his own annual list.

DEPARTMENTS

18 Letters

72 Calendar

75 Marketplace

81 Training

96 Trends

FOUNDATION

Budget process a toss-up as MIS juggles the bottom line

Some lose, some gain in struggle to merge present realities, future vision

BY JAMES DALY
and ROBERT MORAN

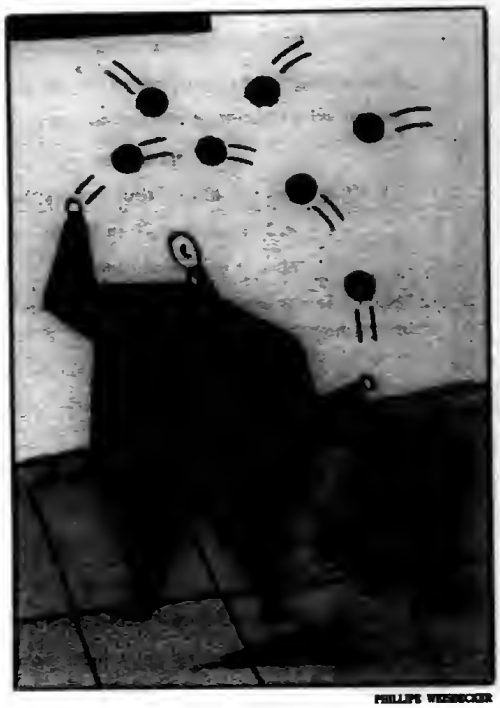
Funny thing about the future. It's never how you expected it to look once it arrives.

Nevertheless, MIS managers face the task of gazing into their crystal balls as they shore up their budget defenses for the next few years. The managers must consider an increasing number of external forces capable of generating economic turmoil.

Some managers are adding to their budgets while others are trimming, depending on top managements' perception of the vitality of the specific industry. Still others, like Jeffery Alperin, assistant vice-president for corporate technology planning at Aetna Life and Casualty Co., contend that such strategies are reactive and therefore viewed at Aetna as imprudent business practices. The trend at Aetna, Alperin says, is to cut costs without regard to forecasts.

The early portion of next year promises smooth sailing, according to analysts, as the economic honeymoon traditionally enjoyed by new presidential eras is expected for the incoming George Bush administration. Unfortunately, things begin to look a little cloudy after that. The most significant wild card promises to be international trade.

"Any position taken by the U.S. that is perceived as protectionist — whether against Japan or Europe — will be a very serious problem for the industry," says David H. Mason, vice-president of Boston-based Northeast Consulting Resources, Inc. Protectionist moves by Congress could result in a foreign-vendor backlash against U.S. companies that do a large overseas business. The result is higher expenses that are, in turn, handed down to the end user.



PHILLIPE WEISSBECKER

Although Japan is viewed as this country's chief foreign economic threat, Europe will take on increasing importance as the future approaches. By 1992, the U.S. could be facing nothing less than the economic unification of Europe.

Essentially, there is a movement that would unite all European countries into a single financial market. Tariffs would be nonexistent, and a single European passport would prevail. This unity could give European vendors an advantage in price wars with U.S. companies.

"The goal is to let a Siemens or an Olivetti become real worldscale competitors because they'll have the strength of a single European market to build on," Mason says. "The argument is that Siemens can't compete with an IBM because West Germany is too small a market. But if you unify Europe, you can create a handful of very big European competitors."

The Japanese still cannot be counted out either and are increasingly challenging U.S. businesses in core industries.

The Council On Competiveness reports that by 1986 the Japanese had captured 65% of the world's semiconductor market, while the U.S. had less than 30%.

The council also sees storm clouds on the horizon: Within the nondefense category, the U.S. spends the smallest percentage on research and development directly related to industrial growth of all the major industrialized nations.

Perennial problems like the budget deficit also continue to nip at the heels of the U.S. economy. "Just how willing are foreign investors going to be to continue to pump money into our economy while we continue to run deficits?" asked Jack Biddle, president of the Washington-based Computer and Communications Industry Association.

Some analysts say these factors could put the U.S. economy in deep trouble. "Ultimately, whoever is the next president will have to deal with a recession," Mason maintains. "In some industries, we're seeing 40% of capital spending going toward information systems. I find it hard to believe that rate is sustainable and at some point that it has to back off. A recession could do that very quickly."

Tightening the belt

Such monetary uncertainties will require MIS managers to keep a tight ship, financially. A recent white paper from The Yankee Group in Boston claiming that the current rate of technological change could lead to a 100% turnover means the average system could have a life span of just 18 months by 1990.

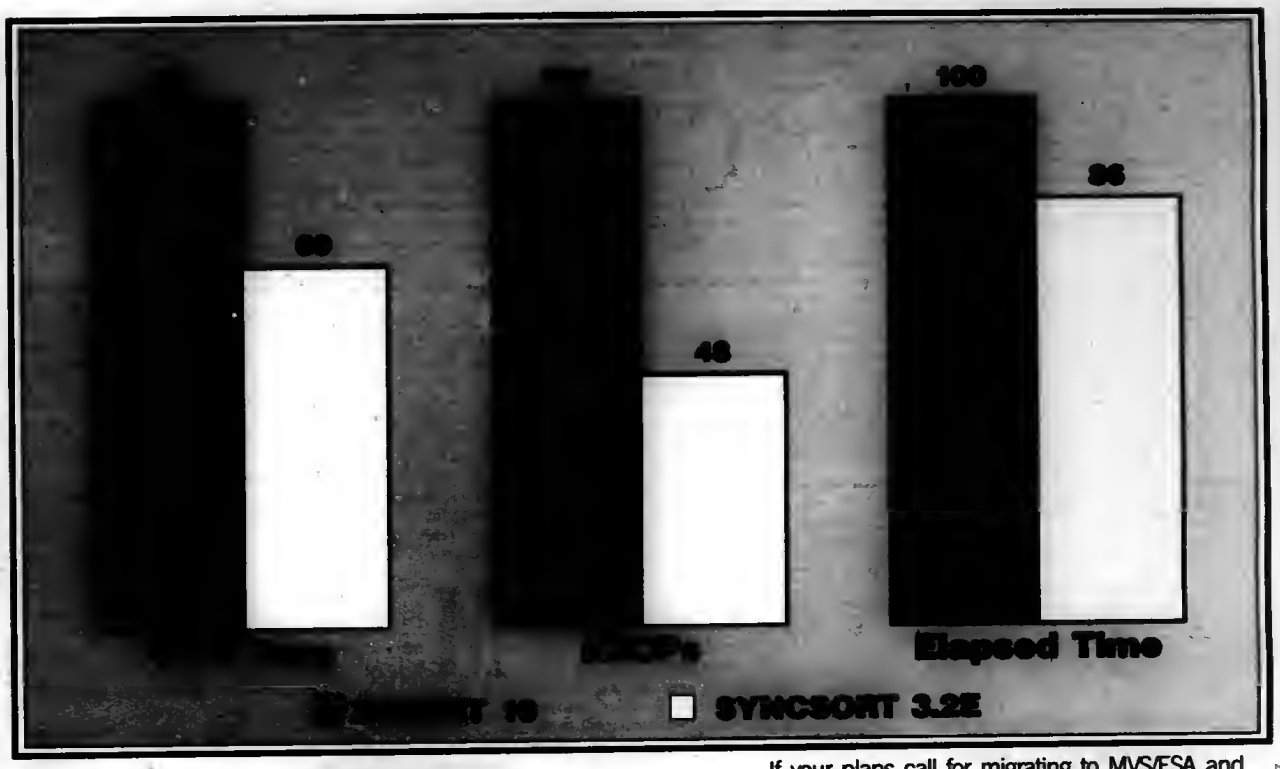
The streamlining that comes of this is also going to result in managerial changes, including a tighter connection between the chief MIS officer and the company chairman and a rethinking of the interaction between man and machine.

"We're competing for a shrinking number of qualified employees," Biddle says. "They don't want to do the dirty work anymore, and automation is the answer. But not automation in the past sense, in terms of simply replacing accountants and billing clerks, but using automation as a technique to tighten up the entire organization."

Fights over intellectual property rights also promise to shake up the MIS office. "The fact that you can secure rights to the look and feel of a program for the length of a copyright — which is

Daly is a *Computerworld* staff writer. Moran is *Computerworld's* Mid-Atlantic correspondent.

SYNCSORT ESA
vs.
DFSORT
on a
3090 with MVS/ESA



ESA in 1989?
Make a date with SyncSort.

If your plans call for migrating to MVS/ESA and you are still using DFSORT, find out why SyncSort is the better choice.

Call us at **(201) 930-8200** to arrange for a comprehensive benchmark on your system.

syncsort INC.

Where Performance is the Issue.

© 1989 Syncsort Incorporated, 50 Tice Boulevard, Woodcliff Lake, NJ 07675

a hell of a long time — can get the whole of society into trouble," says Martin Ernst, an associate at the Center For Information Policy Research at Harvard University in Cambridge, Mass.

The factors that shape today's economic conditions doubtless influence information service budgets in numerous ways. Nevertheless, almost all large data centers are beset with what may seem — but are not necessarily — two opposing objectives: the need to mount costly strategic projects that will keep a corporation ahead of the competition and adherence to tight-fisted mandates on spending.

Aetna believes that a tighter budget leaves more dollars for strategic platforms. Alperin's department, for example, will function with a budget trimmed by 5% in 1989. "We will do more work than last year," he concedes, "but we are much more productive and are finding ways to do even more with less."

Unlike many companies that are just now facing the fact that the days of 10% MIS budget increases are over, Aetna's Alperin says, "as a whole we have been holding expenses pretty flat over the years and reserving any increases for very specific strategic areas."

In contrast, economic forecasts for 1989 coupled with the sting still felt from last year's stock market fiasco have flattened the MIS budget at Brunswick Corp. in Skokie, Ill., a large manufacturer of leisure products, according to MIS director Brian Ellis. The watchword at the company is caution — and that caution spreads to strategic planning methodology, old and new applications, innovations and personnel.

The company now has a formal three-year strategic planning curve — the direct result of the October 1987 crash and economic forecasts, Ellis says. The current MIS budget, which has been cut by an unspecified amount, now spans from 1989 through 1991.

Information services will slow down innovations, concentrating instead on stabilizing existing services to make sure they meet customer needs, with additional efforts to diminish customer complaints. In addition, MIS has felt the impact by having to do without some state-of-the-art equipment, Ellis says.

Ellis says the strategy will help the organization remain profitable if the U.S. economy remains stable. The reduced budget will also likely spare the company from having to cut back in the face of economic downturn.

Times may be tight at Brunswick, but at American Industries, Inc., data processing manager Larry Potter says management "anticipates a rosy 1989, and its budgeting process will reflect it." The 1989 budget will post about a 5% increase, he says, slightly higher than last year's increase, reversing a downward trend evident since 1982.

Budgeting within the organization follows steel industry trends and looks over the shoulder of its subsidiary, American Steel Division, the benefactor of most of the MIS services. According to Potter, the steel industry does not necessarily follow the rest of the economy.

"Although management projects a cool national economy for 1989," Potter says, "it anticipates a good year in steel, helped by both foreign importers and the voluntary trade agreement."

American Industries plans for two years and budgets for the coming year. Those budgets, reviewed quarterly and matched against quarterly forecasts and division results, enable MIS to react quickly, he says.

With a good year projected by management, MIS will likely add one staff member and concentrate on a growing application load and on meeting increasing user demands. In addition, Potter hopes to complete a few projects that have been on the drawing board.

If, however, the economies of the steel industry turn sour, Potter will first cut into staff perqs and conference attendance. The second round would trim services and the third, equipment expenses. "We can judge when to react by measuring the cycles of our business against anticipations for the coming two quarters," he explains.

Like American Industries, Scott Paper Co. would battle a disastrous economic year by trimming conference and training expenditures. But MIS director Ronald Renk does not expect to have to resort to anything of the sort.

Renk says that in 1989, Scott MIS will implement a few strategic projects. Costs for these will represent one increment to the increased budget, which is based on current performance. The other increment, he says, will account for inflation.

At Express Freight Line, Inc., data processing manager David Schmalz has yet to post his 1989 budget, but he anticipates that MIS, like other departments, will have to cutback.

Schmalz does not anticipate a recession in 1989 but says the tight budget is a reality in an industry fraught with competition. "Freight discounts are way out of hand — between 50% and 60%," he says. "The only way to make it up is to cut expenses. It comes down to MIS and other departments."

As a result, he says, development projects "have been slowed, but not stopped, because of staffing shortages and a shortage of tools to speed the development."

At Radnor Corp., a wholly owned commercial real estate subsidiary of Sun Corp. that generates about $30 million annually for the parent company, the MIS budget will increase three times in 1989 — from a meager $100,000 to approximately $300,000. The budget, according to Alan Alesius, manager of data processing, will increase throughout 1990 but not anywhere near the expected 1989 increase.

MIS MUST solve the problem of mounting costly strategic projects while adhering to tight-fisted spending mandates.

Economic forecasts at the company are keenly scrutinized because of the close tie between economic conditions and the purchase of homes as well as business real estate.

"If the current expansion continues, Radnor should experience a year of decent — but not explosive — growth," Alesius says. "If there is an economic downturn and interest rates go up, people will sit tight. It will be a tougher time."

But for the MIS manager, ironically enough, a bad year could be a blessing. Recent companywide growth has diverted the attention of key personnel, leaving little time to attend to standardization and policy issues.

"Our projects portfolio has grown so large that few people have had time, for example, to contribute to getting remote locations standardised," Alesius explains. "1988 was a good year," he adds. "We are looking to add value to the corporation in 1989. It is a good opportunity for MIS."

At Echlin, Inc., a completely decentralized company, some divisions are posting budgets that are over last year's by between 5% and 15%, while others are staying flat, according to Richard Hock, MIS director at corporate headquarters. "We're running like we have always run in the past — carefully. But we have not attempted to curb expenses," he says.

While some divisions have added to their budgets, the MIS budget at headquarters, which Hock oversees, has been dropping for the last seven years. This year, Hock has trimmed the budget by $350,000 — the result of a recent conversion from a mainframe- to a micro-based platform. Hock noted that his practices are not indicative of the other units, although some are leaning to minicomputers and microcomputers.

Hock said he does not anticipate a "deadly economic year" but that if he were forced to trim expenses, he would first freeze capital expenditures and then trim staff. But he said he does not expect to have to resort to such measures. Although Echlin is not recession-proof, he points out, people who do not replace cars do more repair work. "Our 1989 runs started in August, so we are [now] in 1989 and having a good year," he says.●

Computers have made 'change' the watchword of the work force

Terry R. Lautenbach
Senior Vice-President
and General Manager
IBM U.S.

Computers are changing the way we work for both individuals and organizations. By providing timely access to relevant data, computers allow us to spend less time researching and verifying information and more time getting things done. This makes for faster, more informed decision making and it improves our effectiveness and productivity.

Today's computer systems spread memos, documents, images and graphs to individuals throughout an organization. This kind of direct people-to-people communication results in more focused and efficient dissemination of information.

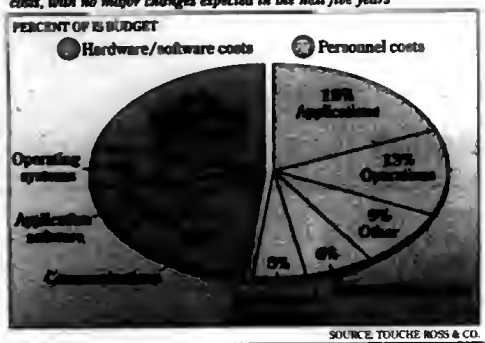
New technologies are bringing more capability to computers, allowing users to manipulate, understand and analyze data in ways they never could before. With access to company databases, decision support systems, expert systems and other technologies, information workers ranging from engineers to scientists to loan officers can work even more effectively.

Computer imaging is another dramatic example of how new information technologies affect work. By reducing paper-based customer information, businesses can realize millions of dollars in savings and significant improvements in customer service.

As organizations become more competitive, the management of information as a strategic resource becomes paramount. A major challenge in the '90s will be the development of software to support the computers that help people to better manage the flow of information. With advanced graphics, touch screens, voice and image recognition running on high-performance hardware and software, computers will continue to make "change" the watchword of the work environment.●

Sharing the wealth

According to a 1988 survey of IS organizations, the average IS budget was spread almost evenly between personnel and hardware/software costs, with no major changes expected in the next five years



SOURCE: TOUCHE ROSS & CO.

Calling the shots for '89

BY MARK BREIBART

It will take a hardy MIS manager to weather the business and technology trends of 1989. Here's a little help from leading forecasters on what to expect in key areas:

Management Strategies

"MIS executives have to get their house in order. For example, they have to get rid of the multiplicity of languages and architectures so they can move more quickly on new technologies. And they have to institute more realistic chargeback systems. They have to hire people with business savvy into MIS positions, even if [these people] are not technicians. If they don't, we're going to blunder into the '90s with the wrong people in the jobs."

Ted Freiser, president
John Diebold Group, New York

"Companies in the '90s will have to understand how to integrate technology into the business. They have to stop viewing MIS as a cost and start utilizing it to make their companies more competitive."

Jim Hall, principal
Index Group, Cambridge, Mass.

Large Systems

Companies will be changing to or considering a two-tier environment rather than a three-tier strategy over the next 18 to 36 months. The architecture will have a layer of micros talking to host IBM 3090-class machines, with servers in the middle based on machines using the 80386 and 80486 chips. DEC won't be able to compete because it has no viable high-end or PC solution.

Robert Tasher, vice-president
International Data Corp. (IDC),
Framingham, Mass.

"The on-line processing systems of the '80s will give way to ad hoc computing in the '90s, with a lot of canned intelligence in the low-end systems."

MIS directors will have to get on top of the trend to give the user more control, instead of fighting it.

Curt Beaumont, director
Systems and Peripherals
Technology Service, IDC

Mid-range Systems

Next year is not going to be pretty. Particularly at the low end, PC LANs — not minis — will be the preferred choice. That approach will also hold true for larger systems when SQL server software becomes available for distributed processing.

DEC's low-end VAXs could soon be in trouble. Even for larger systems, users will eventually throw out their VMS applications and go to third-party programs on the PC. The VAX will become a network server, but only if DEC moves to a standard operating system like Unix and if the VAX is optimized as a server instead of as a time-sharing machine.

"For IBM shops, the focus of SAA is wrong. What's being touted is the ability to push applications onto bigger machines. But people want to move applications to smaller machines, down to their control."

John McCarthy, director
of professional systems research
Forrester Research, Inc.,
Cambridge, Mass.

DEC will try to preserve its proprietary systems. That should be easy for them, at least in the short run. Too many people are happy with VMS.

IBM's AS/400 shows there is still a lot of growth for multiuser systems, some of it as network servers in large firms, but much of it in the small-business market.

Other minicomputer companies will either emphasize nonproprietary systems like Unix or focus on niche markets like Wang with image processing or Prime with CAD/CAM.

Brian Daly, senior associate editor
Datapro Research Corp., Delran, N.J.

Communications

"Growth in the LAN market will continue to be impressive, with token-ring networks increasing even faster than Ethernet ones.

"There will be a gigantic leap in the use of high-performance and superperformance networks with speeds from 100M bit/sec. on up."

Brad Baldwin, industry analyst
Dataquest, Inc., San Jose, Calif.

Software

"There will be more talk than reality about distributed database systems. The technology is here, but users won't be ready for it until they change their view of the proper architecture. For example, the classical database notion is to reduce data redundancy. But as the rules of end-user access have shifted, and as we have LANs with 450 users on them, we cannot have one database that serves all purposes."

William Inmon, senior principal
American Management Systems, Inc.
Lakewood, Colo.

Nineteen eighty-nine will be the year of the distributed database. The software will center around SQL and PCs based on the 80386 chip. If these products deliver as much as promised — and it's a big "if" — they will provide an alternative to minis and mainframes.

Standards will be a bigger topic than they have been at any other time this decade.

George Schussel, president
Digital Consulting, Inc.,
Andover, Mass.

VSAM DATA COMPRESSION
Without the CPU Overhead

SPACE SAVINGS

DATA SET NAME	VSAM TRKS ALLOC	VSAM TRKS USED	IAM TRKS STD	IAM TRKS COMPR	% SAVINGS STD	% SAVINGS COMPR	TOTAL RECORDS	AVERAGE LARGEST	MAX UNCL
BIG.CLUSTER	37155	37155	27855	18600	25	50	4754870	233 502	500
CICS/FILEMASTER. TRANS.CLUSTER	21000	16005	12750	8405	30	50	5008165	150 150	150
IMAGE/ADDRESS.FILE	6015	6005	6405	1575	26	79	438529	680 2080	2080

The VSAM simulation report displays the current size and data characteristics of your VSAM files and how much space IAM will save you with and without data compression.

*To see your VSAM usage, send for INNOVATION's free VSAM reporting programs.

Breibart is a Flagelman Intern working with *Computerworld Focus on Integration.*

FOUNDATION

Clearing the obstacles to CIM

Payoffs have users looking at integration management

BY ELISABETH HORWITT

Computer-integrated manufacturing (CIM) is finally escaping from vendor brochures and "factory-of-the-future" prototypes into the business mainstream. This trend, which began last year and should gain momentum in this one, derives from two related developments.

One is the emergence of communications standards and computing platforms that make it much more feasible for manufacturing companies to coordinate information flow among islands of automation. The other is the increasing number of users who have shed their skepticism and become believers in the feasibility and ultimate payoffs of CIM.

Users' increasingly positive attitude toward this technology was reflected in an Autofact '88 attendee's definition of the discipline: "Cost-cutting on units, doing away with human error, cutting setup and lead time and cutting inventory."

Half-empty glass

Two or three years ago, many manufacturing information systems managers focused on the difficulties rather than potential payoffs of CIM — chiefly, the task of linking together a multivendor melange of factory equipment, hosts and controllers.

This was understandable because, at that time, the job was a formidable one that daunted all but a few giants such as General Motors Corp. and Boeing Computer Services. Few tools existed for integrating manufacturers' multivendor equipment and software installations, which meant that the communications foundation for CIM had to be developed from scratch — and at great expense.

According to Darryl Cain, a supervisor at Deere & Co.'s Harvester Works, CIM implementation is still "a long road to uncertain goals, and the question management asks is, 'Will CIM ever be complete?' " But now, more and more companies — including Deere — have made CIM an intrinsic part of their competitive strategies. And they are much more confident that the implementation can be done at reasonable cost.

A major reason for that confidence is the maturing of communications standards such as Manufacturing Automation Protocol (MAP). Until mid-1988, industry players still seemed to assume that manufacturers needed to settle on just one set of protocols.

Debate on the comparative merits of Ethernet and MAP's Token-Bus protocol on the factory floor was stormy, with Digital Equipment Corp.'s combative chief Ken Olsen keeping the pot boiling with his frequent MAP attacks. Another fierce argument raged over the question of whether, or even when, users should migrate from their existing Transmission Control Protocol/Internet Protocol (TCP/IP) installations to MAP.

This year, with the long-awaited arrival of Version 3.0 last spring, MAP has achieved some degree of stability and vendor support. However, it is unlikely to be adopted universally because many users solved their multivendor connectivity problems years ago with older protocols such as TCP/IP, Decnet and Ethernet.

These users are reluctant to throw out their existing networks just to become MAP-compatible, according to a recent user survey by Advanced Manufacturing Research, Inc. (AMR), a Cambridge, Mass.-based research firm.

But now, most major vendors — DEC included — are promising support for MAP, TCP/IP and Open Systems Interconnect pretty much as a matter of course, and the choice of standard is becoming "somewhat of a nonissue" for CIM implementors, according to AMR President Anthony Friscia. Many users have discovered that they can mix and match various networking protocols.

As Tim Dirr, a computer-aided design (CAD) applications engineer at 3M Co., put it, "It would be great to have just one networking standard, but I'll settle for two or three."

But this level of integration is the easy part of CIM. As the new year comes in, the main concern of many implementors is how to develop applications to manage information flow between different work areas across various hardware and software systems. This is necessary so that, for example, design change orders go to the business host for approval, out over an electronic data interchange link to suppliers and down to the cell controllers for implementation into the

TERRY ALLEN

Horwitt is a *Computerworld* senior editor, networking.

VMCENTER II
Smart Economics.

How Pioneer turns up the volume while turning down costs.

You don't have to be a fanatic about cost control to succeed in the audio business. But it helps.

At Pioneer Electronics, MIS cost savings contribute directly to the company's competitive edge. And MIS officials have taken extraordinary steps to deliver a growing volume of services on a lean budget.

Central to this effort has been the power of VM Software's VMCENTER II.

SAVINGS IN TIME, TAPE, AND DISK SPACE.
Big savings come naturally to VMCENTER II users. In Pioneer's case, the savings have come in three categories: staff time, backup tape, and disk space. Yet they're meeting growing user needs more effectively than ever.

Whether it's adding new users, scheduling off-peak production, or reducing minidisk clutter, VMCENTER II's comprehensive facilities simplify data center administration while keeping a watchful eye on system usage and costs. No wonder Pioneer regards VMCENTER II as a major systems management asset. And an excellent investment in total data processing performance.

© 1988 VM Software, Inc.

VMCENTER II. *THE* VM SYSTEMS MANAGEMENT TOOL FOR THE FUTURE.
This record is impressive. But it's only the beginning. With its broad capability and proven timesaving features, VMCENTER II is the most important tool you can buy for *all* your VM systems—from 9370 to 3090 to whatever the future may bring.

VMCENTER II. A powerful solution for today. A sound investment for the future. For more information, write or call today:

800-562-7100
703-264-8000

VM Software, Inc.
1800 Alexander Bell Drive
Reston, Virginia 22091

VM SOFTWARE INC.

The VM Experts

1-CWX-881226

manufacturing process.

Vendors are just starting to come up with CIM solutions on this higher, more complex level.

First, they are aggressively entering alliances with other hardware vendors, particularly controller vendors, according to AMR Vice-President Bruce Richardson.

"The goal is not cell control but cell integration," he says. "If we're building vitamins or cars, we don't want to walk down to the factory floor with the ordering slip." Mainframe scheduling systems need to be linked to area controllers that coordinate production on the factory floor "so no order is done until the day it's due," Richardson says.

Last fall, DEC and Allen-Bradley Co. announced their Pyramid Integrator. The device comprises an Allen-Bradley cell controller, which provides links to shop floor devices, and a DEC Microvax processor module, which provides integration with plant and area management applications that typically run on DEC systems.

Another recent alliance for integration was formed between Motorola Computer X, Inc. — a Motorola, Inc. subsidiary — and Stratus Computer, Inc. Computer X offers a hardware platform for coordinating the different cells on a factory floor, each of which can be working on a different part of a product or process.

Keeping track

Stratus sells its fault-tolerant hosts as area controllers that can coordinate activities across the plant; it also provides links to design and engineering workstations and IBM hosts that often run administrative and scheduling applications such as manufacturing resource planning.

Computer vendors are also reaching out to the CAD/computer-aided manufacturing side by supporting manufacturing's dominant communications protocols. Both IBM and DEC, for example, have announced support for Sun Microsystems, Inc.'s Network File System and Apollo Computer, Inc.'s Network Computing System. Apollo and Sun have reciprocated by supporting Decnet and Systems Network Architecture. As a result, Sun engineering workstations can send design documents directly to IBM scheduling and bill of materials systems.

But customers want more than just a physical link in order for graphics documents to be sent to the shop floor in a useful form, according to Donald Bell-Irving, a manager of DEC's CIM applications marketing group.

"You need low-cost graphics devices on the shop floor and a fast LAN; but even more, you need a compound document technology" that allows users to append routing slips, comments and changes to a design as it moves from one manufacturing area to the next, he explains. "That technology is just becoming feasible."

The big computer companies' other major marketing strategy is the CIM software platform — a common user interface, communications and database environment that runs on their favorite hardware platforms (see story at right). They are also working with software companies to produce applications and development tools for their platforms.

The software platforms address what Anthony Klemmer, a vice-president at ITP Boston Inc., a Cambridge, Mass., consulting company, refers to as a "technology backlash" against customized CIM applications that were too costly to be practical. "If you can integrate and automate in pieces a platform that allows you to reuse software, standardize additions and thus lower costs, it is well worth it," he says.

Several users, however, say that this latest wave of "open" software interfaces is too recent for them to judge its usefulness to their CIM plans. Some worry that if they choose one vendor's software platform, they will not be able to install those devices that do not support it.

What to do

The solution to this problem is for the host vendors to migrate their software platforms to industry standards such as MAP, according to James Caie, director of manufacturing systems at GM. Caie was in charge of CIM at the famous Saginaw plant. This migration would be a benefit to CIM implementors, since the platforms would provide something that MAP currently lacks: a standardized foundation for application development.

Rather than wait for vendors to come out with more complete CIM standards and better development tools, many manufacturers are going ahead with CIM implementations — with development plans carefully geared to take advantage of what is out there now, both on vendors' shelves and within their own installations.

Savvy IS managers are also tying their CIM plans to specific business goals, rather than taking a wholesale approach to the technology. For example, rocketing interest rates and a depressed economy in the early 1980s drove Deere to find ways to cut inventory and production costs via CIM, according to David Scott, manager of marketing for Deere Tech Services. "When interest rates are 22.5%, inventory starts eating up a lot of cash."

The manufacturer implemented a top-down plan with a bottom-up implementation that "made use of existing equipment and didn't go overboard putting technology in for technology's sake," Scott emphasized. The payback: Deere just announced record earnings for 1988, and its factories can continue to turn a profit even running at 30% to 35% capacity.

Deere was among the pioneers, but a number of other companies are turning to CIM.

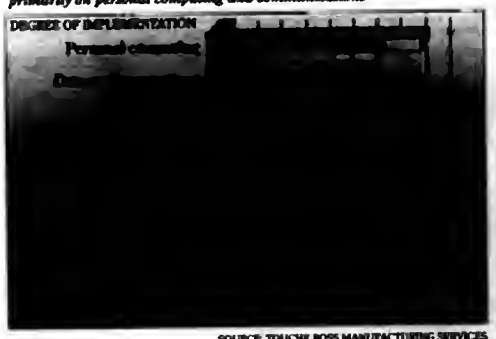
Barring catastrophes in the manufacturing sector and the U.S. economy in general, we should see a snowball effect in the CIM world in the next few years. As the new wave of CIM implementors report the paybacks they have gleaned, yet more companies will be encouraged to start their own installations. This, in turn, will cause vendors to accelerate their efforts to provide better products and tools to gain greater shares of the burgeoning CIM market.

While the term "computer-integrated manufacturing" was coined only a few years ago, the networking, software and computing technologies that serve as CIM's foundation have been developing for decades.

This should reassure IS managers who do not like to bet their budgets on untested products. While the leading edge of CIM technology may be vaporware, there is now a solid body of available products to get implementors going. It's time to take the plunge. •

Work tools

Manufacturing companies are focusing their implementation energies primarily on personal computing and communications



SOURCE: TOUCHE ROSS MANUFACTURING SERVICES
CW CHART

What's expected for CIM in 1989

Manufacturers can expect the major computer vendors to come knocking on their doors in 1989 with a bouquet of new software development tools, third-party alliances, networking products and "open" interfaces.

These offerings, many of which were announced in 1988, were designed to position each vendor's favorite system as a computer-integrated manufacturing (CIM) platform that will provide links to other devices in other areas of the manufacturing environment. What follows is a brief rundown of what the customer can expect to see from the three major players.

One factor that will influence how well these vendors can sell their respective CIM platforms is their share of the area-controller market, says Advanced Manufacturing Research, Inc. (AMR), a Cambridge, Mass.-based market research firm. Such devices could easily be CIM linchpins, since they provide coordination across cells as well as the link to plantwide scheduling and manufacturing resource planning (MRP) systems. Market share figures are AMR's.

• **IBM's** market share in area control is between 8% to 10%. An obstacle between IBM and CIM market success has been the incompatibility of its product lines — particularly the Personal Computers it sells to cell controller manufacturers and the mainframes that run MRP.

Late last year, IBM began to address this problem by, as one company spokesman put it, "moving Systems Application Architecture [SAA] down to the factory floor." SAA is a set of interfaces designed to provide application portability across various IBM product lines. Late last year, IBM introduced the Distributed Automation Edition (DAE) platform for cell control. Running initially on the Personal System/2, OS/2 Extended Edition and later on a 9370 running VM, the platform is said to include SAA communications and database elements and, soon, OS/2-based Presentation Manager user interface elements for CIM application development.

IBM is also aggressively seeking third-party application developers to support its platform: It announced more than 30 such partners at Autofact 88. The platform will initially support several vendors' shop-floor devices, including Allen-Bradley Co.'s, IBM says. Its open interface is available for other vendors that want to tie in their own systems. Look for IBM to extend or at least link its DAE platform to its MRP hosts via SAA.

• **Digital Equipment Corp.** has an area-control market share of 40%. DEC is applying its "We have it now" strategy to the manufacturing sector. The company is marketing a CIM platform based on its VAX/VMS systems, RDB database and Decwindows user interface.

While it does provide some CIM software development tools, DEC's specialty is working with niche vendors to develop software solutions that run on its VAX/VMS platform, a company spokesman says. The first two solutions were announced at Autofact 88. DEC plans to introduce more this year, along with VAX software that brings scheduling and status information from an IBM MRP system down to the shop floor.

> AN OBSTACLE between IBM and CIM market success has been the incompatibility of its product lines — particularly the PCs it sells to cell controller manufacturers and the mainframes that run MRP.

Unlike IBM, DEC is not trying to compete with cell controller vendors but only to sell them Microvaxes as the basis for their products, the company claims. (IBM does this too, with its PCs and now PS/2s). DEC's latest deal of this kind was with Allen-Bradley, which has long been a big consumer of IBM PCs.

• **Hewlett-Packard Co.'s** share of area-control market is around 22%. HP's CIM platform is the HP 9000 running HP-UX. However, a major HP reorganization late in 1988 put together the HP 3000 commercial group and the HP 9000 technical sectors into one manufacturing application group. Seamless migration of applications from one type of system to the other is a natural evolution, says HP product manager Jane Forster.

During the past year, HP has introduced HP-Industrial Precision Tools, a software development environment that provides software for data management, human interface and cell device connectivity that can be reused for different CIM applications, Forster says. •

ELISABETH HORWITT

2001 MARCUS AVENUE
LAKE SUCCESS, N.Y. 11042
TELEPHONE (516) 328-7000
FAX (516) 354-4015
TELEX 6973556

Software Engineering of America

COMPANY PROFILE

Dear Mainframe User:

We, at Software Engineering of America, have created this letter at the request of a large number of mainframe users. In light of all the turmoil brought about by the current spate of mergers and acquisitions, many of you have told us that you are interested in the plans and intentions of the companies with which you do business. Since one of our main goals is keeping in tune with the concerns of the user community, we are more than willing to comply.

SEA was founded in February 1982 by a group of professionals with a long history of involvement in the computer industry. The founders brought with them a broad range of expertise in the development and support of high-quality software systems, obtained through experience in industry, government and leading software companies.

The principles upon which SEA was founded are the following:

- To produce a diverse line of integrated system software products, developed and enhanced based on user requirements.
- To provide first-rate support for those products-24 hours a day,7 days a week.

Strict adherence to these very basic principles have propelled SEA from a 1982 startup to our current position of over 6000 licensed users in more than 40 countries. With a consistent ranking in Software Magazine's "Top 50 Independent Software Vendors", SEA has emerged as a leader in the systems software market.

SEA PRODUCT GROUPS

Operations Management

SEA provides a complete line of operations management solutions covering all critical areas, including job scheduling, master console management, report archival, report management and distribution, JCL checking and management, message management, and the complete viewing, archival and retrieval of all types of Sysout and Syslog.

We are the only company that provides such a complete line of operations management software, backed-up by first-rate technical support. With over 2,500 users choosing SEA as their single source for operations management software, SEA has assumed a position of leadership in the field. Many users tell us the reason they have selected our products is superior support, as well as our integrated approach to long term product development.

DASD/Data Management

SEA's DASD/Data Management tools have become corporate standards, used in one out of every five MVS data centers worldwide.

Providing solutions for high-speed storage management, PDS dataset management, sequential dataset management, and VSAM control and optimization, SEA has set a new standard for efficiency and high performance in DASD and data management software.

SUPPORT AND DEVELOPMENT

SEA's Technical Support Department is divided into two levels. First-level support fields all initial contacts. While over 85% of all contacts are resolved on the initial call, if first-level support is unable to provide a solution, the call is transferred to second-level support. All second-level support personnel are members of Product Development Teams. While most calls are solved at the first-level, involvement with technical support keeps SEA developers in greater touch with our users. This procedure enables our developers to respond more effectively to the needs of the user community.

SEA's approach to development is to keep Product Development Teams together, working on specific products for the long term. We have found that this approach generates a high level of dedication and expertise. We believe that this methodology is the reason SEA has received such consistently high ratings from our users, for technical support and product development.

COMPANY ORGANIZATION

SEA is a privately held company, whose growth over the years has been internally funded by product sales. Our users have indicated that they prefer us to remain independent. This independence guarantees our ability to continue to provide the highest standard of product support and development currently available.

Software Engineering of America is proud to supply the mainframe user community with the above information about our company. We would also like to take the opportunity to express our appreciation for the support that we receive from over 6000 users worldwide. In return, we shall continue to deliver to our users, the highest level of dedication and support available in the industry.

If you are currently not an SEA user, we invite you to take a free, no-obligation trial of our products. We are certain you will find, as thousands of others have, that our products will provide cost-effective solutions to your installation's needs.

Thank you,
Software Engineering of America, Inc.

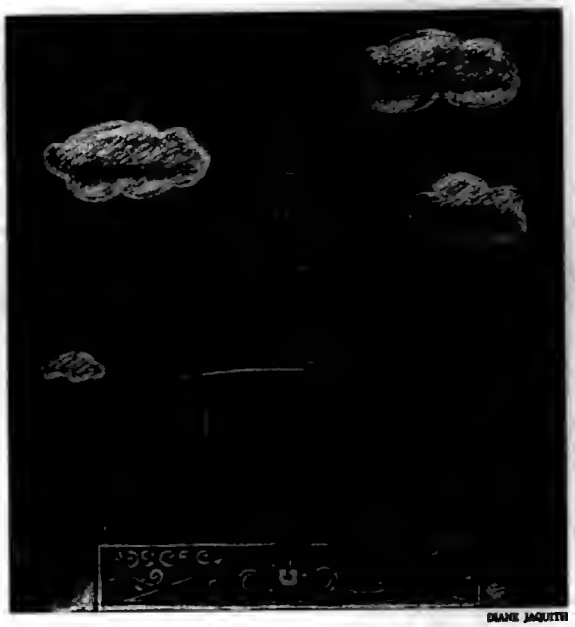
SEA

International Offices
NeubruckestraBe 30 • 4400 Münster • West Germany • Tel. (0251) 54447 • 42569
88A Searle Street • Cambridge / Cambs. CB4 3DD • England • Telephone: (0223) 312147 / 350910

FOUNDATION

As Bush team boards carousel, high-tech prepares for the ride

Pondering new approaches for new players



DIANE JAQUITH

BY MITCH BETTS

Sometimes Washington seems a little like a TV game show — the categories stay the same, but the players keep changing. In the coming year, the categories for the federal policy game will sound quite familiar: taxes, trade and telecommunications, the three Ts. But now the computer community gets to deal with a new set of players, namely the incoming administration of President-elect George Bush.

"Apparently it is going to be less of a policy transition than a personnel transition," says Olga Grkavac, senior vice-president of government relations at ADAPSO, the computer software and services industry association. For example, the changeover may trigger the appointment of a new U.S. trade representative, a new assistant attorney general for antitrust, a new secretary of commerce and new members of the Federal Communications Commission.

The Bush team is likely to be a mix of holdovers and new appointees, all with strong Republican credentials, Grkavac says, although the infusion of new blood may bring some subtle changes in policy and emphasis. Computer industry lobbyists point out that the new political appointees must be "educated" about the needs of high-technology industries.

Betts is *Computerworld's* Washington, D.C., correspondent.

For example, the regional Bell holding companies will need to develop ties with a new batch of administration officials in their high-powered effort to win freedom from business restrictions set down in the 1984 AT&T divestiture decree, which keeps them out of the long-distance telecommunications, electronic publishing and manufacturing businesses.

Lose-lose situation

The Bell companies would have been losers whether Bush or Michael Dukakis had won the election, because they are losing valuable allies in the outgoing Reagan administration, according to a report by George R. Dellinger, a telecommunications analyst at Washington Analysis Corp., a securities research firm in Washington, D.C.

Consequently, must of the high-tech trade associations are busy sending position papers to Bush's presidential transition team to influence the movers and shakers in the forthcoming adminstration. Among the filers are the American Electronics Association, the Computer and Business Equipment Manufacturers Association (CBEMA), the Council on Competitiveness, the Computer & Communications Industry Association and the Council on Research and Technology (Coretech).

Coretech and the Council on Competitveness, for example, are urging the new administration to appoint a presidential advisor on science and technology and improve the coordination of federal technology policies.

W. J. Sanders III, chairman and chief executive officer of Advanced Micro Devices, Inc., a Sunnyvale, Calif.-based semiconductor company, went so far as to publish a "Dear George" letter as a full-page newspaper advertisement. It appears there will be no shortage of advice on how the Bush team should handle the three Ts.

Taxes. One area of concern for corporate America — including MIS managers and the computer industry — is whether a big tax hike to close the federal government's $130 billion budget deficit is in the offing.

Higher corporate taxes could mean less money to spend on technology, a point that was underscored when the computer industry howled in protest at a proposal by presidential candidate Jesse Jackson to raise corporate taxes by $20 billion. That really got the industry's attention.

"You can't say that technology is important for competitiveness and then just take all of the money you're supposed to invest," a CBEMA spokeswoman said at the time.

However, Bush remains adamantly opposed to big tax hikes, and Congress will find a way to sidestep the issue in 1989, analysts say. Instead of a large tax increase, L. Douglas Lee, an economist at Washington Analysis Corp., predicts that Congress and the Bush administration will hammer out a modest, $25 billion budget package of spending cuts and revenue boosters.

"We believe that constructing a $25 billion deficit-reduction package for the 1990 budget is a very manageable task," Lee says.

In the past, Congress has regularly produced similar packages composed of some spending restraint, some modest increases in excise taxes and optimistic economic assumptions.

All No Smoke. ORACLE Version 6.

U.S. SEMINAR SCHEDULE

AK	Anchorage	Feb 6a/
AL	Birmingham	Jan 11c
	Huntsville	Feb 7g
	Montgomery	Feb 23
AZ	Phoenix	Feb 7c/m
	Scottsdale	Jan 12r
	Tucson	Feb 14
CA	Costa Mesa	Jan 24c/m Feb 23m
	La Jolla	Feb 9mm
	Los Angeles	Jan 19/m Feb 16mr
	Ontario	Jan 10
	Oxnard	Feb 2/m
	Sacramento	Jan 17r
	San Diego	Jan 17/r
	San Francisco	Jan 24/r Feb 15s/r
	Santa Clara	Jan 12/m Feb 9st
CO	Colorado Springs	Feb 22r
	Englewood	Jan 31/m
CT	New Haven	Jan 11s/p
DC	Washington	Jan 18g Feb 16g
FL	Boca Raton	Feb 7/m
	Jacksonville	Jan 19/r
	Miami	Jan 17/r
	Orlando	Jan 18/r Feb 9g
	Pensacola	Feb 22
GA	Atlanta	Jan 17/f
	Savannah	Feb 16/p
IA	Des Moines	Jan 17/f
IL	Chicago	Jan 25/f Feb 22r*
		Feb 28/m
	Springfield	Feb 14c
IN	Indianapolis	Jan 31/r Feb 21ar
KS	Wichita	Feb 16r
KY	Lexington	Jan 24
	Louisville	Feb 7r
LA	New Orleans	Jan 27/f
	Shreveport	Feb 16r
MA	Boston	Jan 17/r
	Springfield	Jan 19r
	Worcester	Feb 8
MD	Baltimore	Jan 24m Feb 7r
MI	Dearborn	Feb 7/f
	Grand Rapids	Jan 12/f
	Lansing	Feb 14/p
	Troy	Jan 10c
MN	Minneapolis	Jan 11/f Feb 15cr
MO	Kansas City	Jan 26/f
	St. Louis	Jan 12/ Feb 9r
NC	Charlotte	Jan 25
	Greensboro	Feb 15r
	Raleigh	Jan 10/r
NE	Omaha	Jan 6r
NH	Merrimack	Jan 12
NJ	Iselin	Jan 10mr Feb 15/r
	Princeton	Jan 18/ Feb 15r
	Secaucus	Jan 26/
NY	Albany	Jan 18r
	East Syracuse	Jan 10mr
	Fairport	Feb 9/r
	Melville	Jan 18/ Feb 15r
	New York City	Jan 11r Jan 25/
		Feb 7mr Feb 22/
OH	Akron	Feb 1/
	Beachwood	Jan 10c
	Cincinnati	Jan 26/
	Columbus	Jan 12/
OK	Oklahoma City	Feb 8/m
	Tulsa	Jan 24/p
PA	Harrisburg	Feb 9
	King of Prussia	Jan 27r
	Philadelphia	Jan 24g Feb 6/r
	Pittsburgh	Jan 18/m
	Scranton	Feb 15/p
RI	Providence	Feb 2/
SC	Greenville	Feb 8/
TN	Knoxville	Feb 6r
	Memphis	Feb 16c
	Nashville	Jan 12c
TX	Austin	Jan 19/
	Dallas	Jan 10/p Feb 1/r
	Houston	Jan 12/f Feb 9/r Feb 14g
	San Antonio	Jan 20/
UT	Salt Lake City	Feb 1/
VA	Richmond	Jan 11/ Feb 22c
	Roanoke	Feb 2
WA	Seattle	Jan 5/m Feb 21/r
WI	Madison	Feb 22/
	Milwaukee	Jan 26/r

For Canadian Seminars

Call (800) 387-4407, except in Quebec, call (514) 337-0755.

The following key indicates additional afternoon seminars that are offered with their seminar dates.

- a Integrating Macintosh into Corporate Network
- c CASE Tools
- f Oracle Financials
- m Computer Integrated Manufacturing (CIM)
- p PC Workgroup Solutions
- r SQL*Reporterwriter
- s ORACLE Transaction Processing
- v Value Added Relicensors (VARs)

Please note:

- g These seminars are directed to the Federal Government only
- * Only the indicated afternoon seminar is held on these dates

Attn.: National Seminar Coordinator
Oracle Corporation • 20 Davis Drive
Belmont, California 94002

1-800-345-DBMS, ext. 8120

☐ My business card or letterhead is attached. Please enroll me in the *FREE* ORACLE seminar to be held

at: _____

on: _____

COMPUTERWORLD

Whatever tax bill emerges, the high-tech industry will fight hard to add a permanent extension of the 20% tax credit for research and development expenditures, according to John L. Pickitt, president of CBEMA.

In 1988, Congress approved a one-year extension of the R&D credit, now scheduled to expire at the end of 1989. The good news is that Bush has publicly stated his support for a permanent R&D credit; the tough part is finding a way to pay for the popular tax credit, which costs the U.S. Treasury about $705 million a year in foregone revenues.

Bush also supports cutting the capital gains tax rate to 15% on investments held for at least one year — a proposal supported by the National Venture Capital Association and the small firms in the American Electronics Association. Supporters say the tax break provides an incentive to venture capitalists to invest in new and growing high-tech firms. However, this proposal faces tough opposition from Congress.

Trade. The computer industry can expect the Bush administration's trade policy to look a lot like the Reagan administration's. During the election campaign, Bush seemed satisfied with the Reagan trade record and demonstrated the same free-trade instincts.

But Stephen D. Cohen, an international trade analyst at Washington Analysis Corp., notes that the Reagan-Bush team actually followed a "pragmatic" trade policy rather than a pure free-market policy. That is, it resisted trade barriers only when political pressures were not severe.

Cohen suggests that the Bush administration will be forced to have a slightly tougher trade stance, since it will be faced with a continuing massive trade deficit and the 1988 omnibus trade law, which mandates a more aggressive government effort to reduce or eliminate foreign barriers to U.S. exports. In fact, the Bush administration may spend most of 1989 just implementing the 1988 legislation, ADAPSO's Grkavac says.

According to a report by the U.S. Department of Commerce, the Omnibus Trade and Competitiveness Act of 1988 contains the following provisions of interest to U.S. high-tech firms seeking to boost exports:

- It gives the president authority to negotiate a multilateral trade agreement to open up foreign markets to U.S. goods and services for the next 20 years.
- It sharply reduces the burdens of national security export controls. The law focuses on restricting the export of truly strategic technologies to the Soviet bloc while relaxing controls on trade in the free world.
- It permits the U.S. Trade Representative to initiate trade complaints against countries that fail to provide adequate intellectual property protection for U.S. products.
- It also requires the U.S. Trade Representative to identify countries that have trade barriers affecting the telecommunications industry and requires negotiations to eliminate or reduce the barriers. If the talks fail, the president is required to take some retaliatory action.

Competitiveness report card

The U.S. only gets a "C" for its efforts in the past five years to compete with foreign nations, according to 91 members of the Council on Competitiveness

Overall grade	C
Executive branch	C
Congress	C−
Business	B−
Labor	C
Higher education	C+
Elementary/secondary education	D+
State governments	C
Local governments	C−

SOURCE: COUNCIL ON COMPETITIVENESS
CW CHART

Telecommunications. Congress has already set the stage for the two big communications battles of 1989. One controversial issue is the FCC's proposal to overhaul the way it regulates AT&T's long-distance rates.

The proposal would replace the current system of profit ceilings with a new scheme of so-called "price caps," which place an annual ceiling on the price of long-distance services rather than regulating the company's rate of return.

Key members of Congress, not convinced of the price cap plan's benefits, have already put the FCC on notice that they want the commission to proceed very slowly. Likewise, business network managers have charged that the plan contains numerous flaws that could make users worse off than they are under the existing regulatory system.

For example, the International Communications Association and the Ad Hoc Telecommunications Users Committee argue that the baseline for the initial price caps is set too high and that the annual adjustment formula will not provide any substantial rate cuts.

The second big issue is whether the regional Bell holding companies should be freed from the business restrictions imposed by the AT&T divestiture decree. Members of both the House and Senate signaled their intent to address this issue by sponsoring "free the Bells" resolutions in 1988. Though the resolutions don't have any legal effect, they send a political message.

Clearly, 1989 will be a year of new players but no big surprises in Washington. Analysts conclude that the computer community can bet on three basic trends: modest advances toward deregulation of the telecommunications industry, coupled with lots of congressional hearings; a slightly more aggressive trade policy; and a renewed lobbying campaign to extend the R&D tax credit for high-technology industries.

In essense, that's the kind of undramatic, incremental progress that voters said they wanted when they went to the polls in November. The business community supported Bush over Dukakis partly because it did not want any dramatic change in government policies, says Ed Zschau, chairman and CEO of Centstor Corp., a computer peripherals company in Silicon Valley. •

Hot bills for '89

Aside from the broad policy issues of economic competitiveness, Washington officials will be grappling with some specific legislation of interest to MIS managers:

• **Anti-virus law.** There will be pressure to amend the Computer Fraud and Abuse Act of 1986 to cover the kind of computer virus attacks that hit the Internet research network in early November. All eyes will be on the so-called Herger bill, introduced last July by U.S. Rep. Wally Herger (R-Calif.), which outlaws computer viruses and carries a penalty of up to 10 years in prison.

Buck BloomBecker, director of the National Center for Computer Crime Data in Los Angeles, says the most interesting feature of the bill is that it applies to all virus crimes affecting interstate or foreign commerce — not just federal government computers. "I suspect there will be some debate over that jurisdictional issue," he says.

• **Section 1706.** This legislation concerns the controversial section of the Tax Reform Act of 1986 that requires computer consultants working for brokers to become employees unless they meet the stringent legal standards for classification as independent contractors.

Congress recently ordered the U.S. Department of the Treasury to conduct a definitive study on the issues surrounding Section 1706 and to report in September 1989. The ultimate fate of Section 1706 probably hinges on the results of that study, according to Joseph E. Collins, spokesman for the Data Processing Management Association in Park Ridge, Ill.

• **Software rental.** A bill to block unauthorized rentals will be reintroduced, "and we see that going forward," ADAPSO's Olga Grkavac says.

• **Government computer security.** Federal MIS managers will be busy complying with the Computer Security Act of 1987, which requires detailed security plans, training programs and the identification of sensitive systems. The security plans are due Jan. 9, a year after the act became law.

• **Halon regulation.** MIS will be watching to see what the U.S. Environmental Protection Agency does to regulate the use of halon. Last fall, the EPA called for a complete phaseout of halon — a chemical used in data center fire-suppression equipment — because it contributes to the depletion of the Earth's protective ozone layer.

• **The 11th Amendment.** ADAPSO expects hearings on whether the 11th Amendment exempts universities from certain laws, such as those governing software copyrights. •

Why things are better

James Sytter
Vice-President of IS
Rockwell International

When information technology was first introduced, many people worried about the negative impact of computers on the nature of work. These predictions have been proven wrong. Computer-based systems continue to offer the potential to enrich the content of jobs and aid in reaching high levels of quality.

Contrary to fears that were expressed in many circles, employment rose rather than declined. The redefined jobs that grew out of early automation efforts have become more essential. ; for example, greater consequences exist when failure occurs. Over the years, workstation penetration continued throughout U.S. industry.

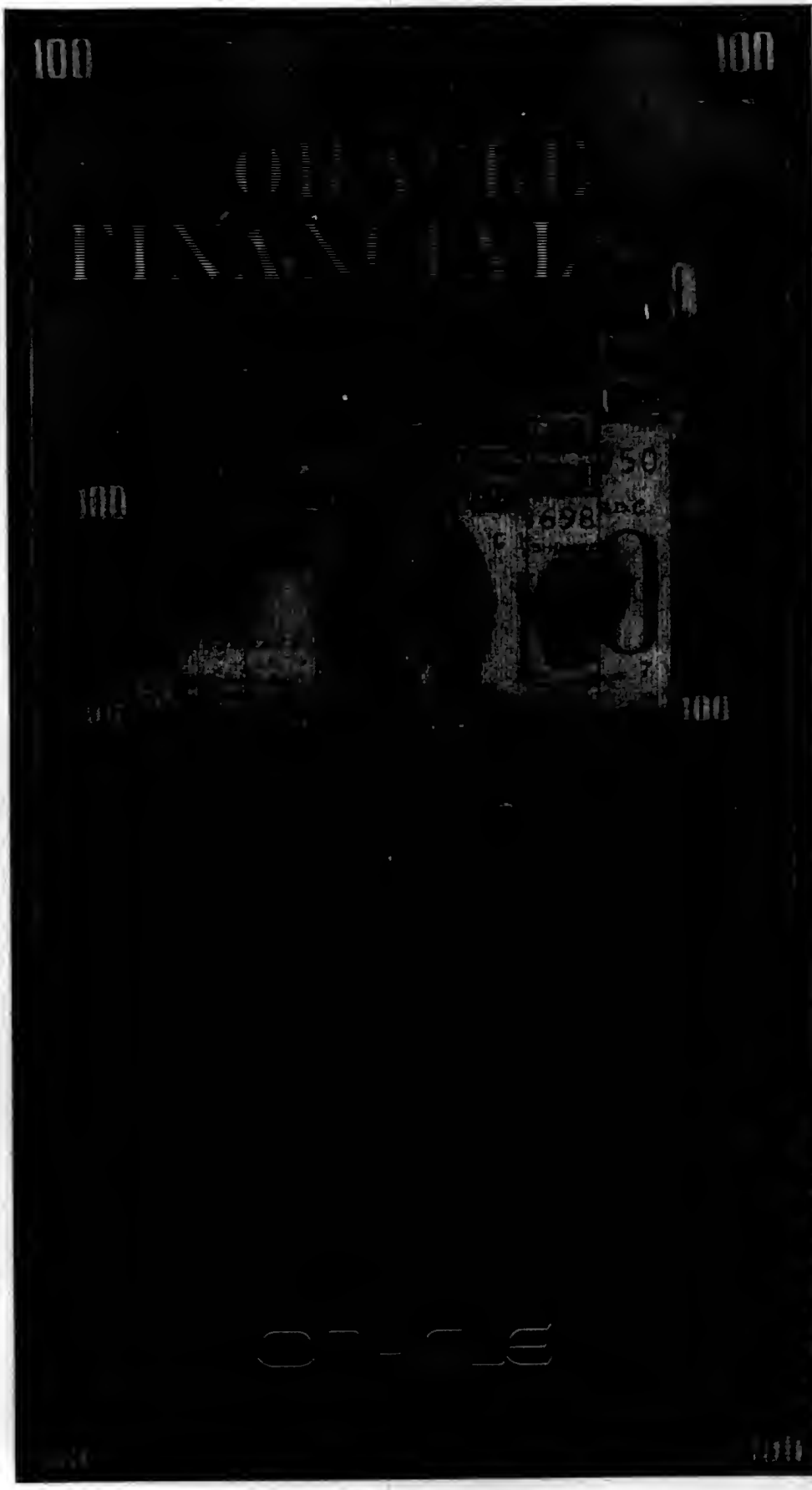
Computers have profoundly affected the way we work in engineering and in factory operations. Quality has risen steadily due in large part to interactive graphics workstations in engineering and factory automation equipment in manufacturing plants.

Many specific jobs in engineering associated with checking and support services have been automated and made nearly error-free because of the built-in validations defined in software programs.

Jobs on the factory floor have been transformed from repetitive, monotonous and often dangerous tasks to ones working with sophisticated systems.

Computer-based systems in the offices have shortened the time to process transactions. Tasks previously performed in sequential fashion can now, with the proper databases and communications systems, be done in a more interactive and concurrent manner. More informed decisions are possible.

Much has been achieved through the use of information technology. Automated features that monitor everything from spelling and grammatic construction to arithmetic calculations, design parameters and machine-tool performance have and will continue to assist us in becoming more productive in raising the quality of our work. •



Oracle Financials Seminars

AK	Anchorage			Feb 6
AZ	Phoenix			Feb 7
	Scottsdale			Apr 11
CA	Costa Mesa	Jan 24	Apr 25	Jun 22
	Los Angeles	Jan 19	Mar 14	Apr 20
	Ontario			Mar 21
	Sacramento			Mar 21
	San Diego	Jan 17		Mar 16
	San Francisco	Jan 24	Mar 29	May 18
	Santa Clara	Jan 12		Mar 9
	Universal City			Apr 6
CO	Englewood	Jan 31	Mar 7	Jun 6
CT	Farmington			Mar 7
	Stamford		Mar 21	Jun 8
FL	Boca Raton			Feb 7
	Jacksonville			Jan 19
	Miami			Jan 17
	Tampa			Mar 22
GA	Atlanta			Jan 17
	Savannah			Apr 27
HI	Honolulu			Mar 14
IA	Des Moines			Jan 17
ID	Boise			Apr 13
IL	Chicago	Jan 25	Feb 28	Mar 21 Apr 18 Jun 14
IN	Indianapolis	Jan 31	Mar 22	Jun 7
KY	Louisville			Apr 4
LA	New Orleans			Jan 27
MA	Boston	Jan 17	Apr 20	Jun 6
	Burlington			Mar 15
MD	Baltimore			Apr 12
	Columbia			Mar 15
ME	Portland			Mar 2
MI	Dearborn		Feb 7	Apr 4
	Grand Rapids	Jan 12	Mar 8	Jun 6
	Lansing			Feb 14
	Troy		Mar 7	Jun 7
MN	Minneapolis	Jan 11	Mar 14	Jun 13
MO	Kansas City		Jan 26	Jun 27
	St Louis	Jan 12	Mar 9	Jun 6
NC	Raleigh			Jan 10
NE	Omaha			Apr 6
NJ	Iselin	Feb 15	Mar 30	Jun 28
	Princeton		Jan 18	Mar 15
	Secaucus	Jan 26	Mar 2	Apr 19
NM	Albuquerque		Mar 7	Jun 7
NY	Buffalo			Jun 6
	East Syracuse			Jun 15
	Fairport			Feb 9
	Melville		Jan 18	Mar 15
	New York City			Jan 25 Feb 22 Apr 19 Jun 14
OH	Akron			Feb 1
	Beachwood			Apr 5
	Cincinnati		Jan 26	Mar 23
	Columbus		Jan 12	Mar 9
OK	Oklahoma City			Feb 8
	Tulsa			Jan 24
OR	Portland			Mar 14
PA	Philadelphia	Feb 6	Apr 10	Jun 19
	Pittsburgh	Jan 18	Mar 15	Jun 14
	Scranton			Feb 15
RI	Providence			Feb 2
SC	Charleston			Mar 9
	Greenville		Feb 8	Apr 13
TN	Memphis			Apr 19
	Nashville			May 4
TX	Austin			Jan 19
	Dallas		Jan 10	Feb 1 Mar 7 Apr 4 May 4 Jun 7
	Houston		Jan 12	Feb 9 Mar 9 Apr 6 May 4 Jun 8
	San Antonio			Jan 20
UT	Salt Lake City			Feb 1
WA	Seattle	Jan 5	Feb 21	May 17
	Spokane			Apr 25
WI	Madison			Feb 22
	Milwaukee	Jan 26	Mar 8	Jun 6

Attn: National Seminar Coordinator
Oracle Corporation
20 Davis Drive
Belmont, California 94002
1-800-345-8086, ext. 8110

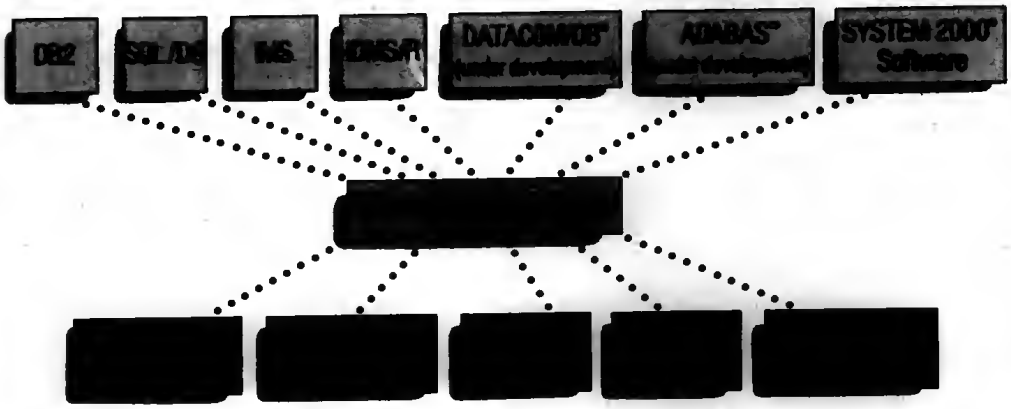
☐ My business card or letterhead is attached. Please enroll me in the *FREE* Oracle Financials seminar to be held

at: _____

on: _____

COMPUTERWORLD

Get the Facts from Your DBMS.



The most powerful applications software has joined forces with the most popular data base management systems. To turn raw data into meaningful facts. To analyze, estimate, optimize, simulate. To produce custom reports and color graphs. Whatever your information need, the SAS System delivers more from the data you store.

Don't Just Store Your Data. Explore Your Data.

The SAS System's ready-to-use tools uncover the real meaning of all those names and numbers. Forecast sales and cash flow. Perform statistical analyses. Build financial and planning models. Create spreadsheets of unlimited size. Schedule projects for best use of time and resources. Produce stacks of personalized letters. Generate calendars, charts, and many other formatted reports. Spot relationships and graph trends with powerful presentation graphics.

Or develop your own applications with the SAS System's efficient fourth-generation language. Customize these applications any way you wish.

If You Know Data Bases. And Even If You Don't.

Menu-driven interfaces link the SAS System with DB2, SQL/DS, IMS, or [illegible] SYSTEM 2000™ Data Management [illegible]

users, even those who know nothing about data bases, have immediate access to the data they need. It's as easy as filling in the blanks!

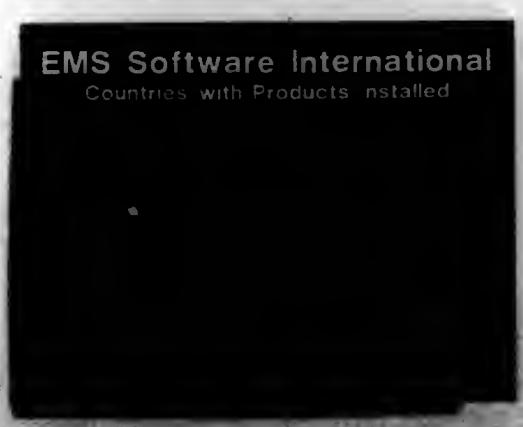
Extract data from your DBMS for use in SAS System applications. Load data from the SAS System directly into your DBMS. Update values in a data base directly from a SAS System application. All without risk to data security. The SAS System lets you choose which users browse or update specific files.

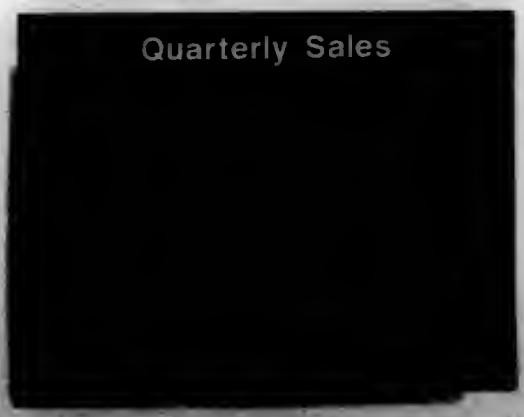
Get the Facts Today. And Get 30 Days Free.

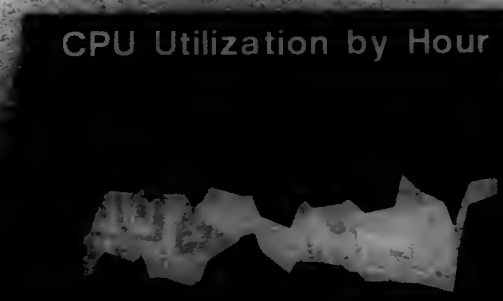
Bring the SAS System together with your data base. You'll receive [illegible] software—plus training, documentation, [illegible]

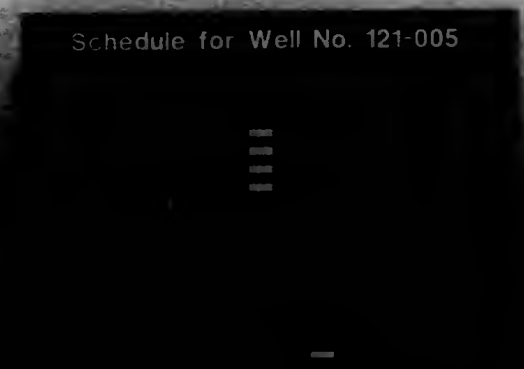
to get [illegible]

Get the SAS® System.









Second annual Dubious Distinction Awards

Computerworld *again tars, feathers, needles, mocks and generally giggles at some folks who richly deserve it*

If history teaches us anything, it is to expect the unexpected — just ask President-elect George Bush. On his way to the Oval Office, Bush faced off with such unlikely foes as the governor of Massachusetts and a fundamentalist minister. He has named the governor of New Hampshire to run the White House. He met with Mikhail Gorbachev right after the Soviet leader announced unilateral cutbacks in his armed forces. The man who called Ronald Reagan's policies "voodoo economics" is now preserving Reagan's economic reforms.

Despite such unexpected scenarios, which have turned conventional wisdom on its head this year, we continue to expect reality to conform with our plans. The MIS community and vendors are no exceptions. In an effort to once again show how ridiculous real life can be, here are *Computerworld's* Dubious Distinction Awards for 1988.

If it ain't broke, don't fix it! They were the first to get it right, and when they got it wrong, they did it in a big way. "They" are American Airlines. The "on-time machine" added a software enhancement to its Sabre system that prevented it from doing what it does best: selling lots of airplane seats.

Sabre's "yield-management system," enhanced in June, failed to show the correct number of discounted fares available for reservations last summer. The flaw cost the company an estimated $50 million.

The software revision that wasn't. Few software revisions have been announced and not delivered as frequently as 1-2-3 Release 3.0. The most recent nondelivery of the most popular spreadsheet package ever was accompanied by a drop in Lotus' stock price. Meanwhile, top dog Jim Manzi was revealed to be the second highest paid executive in the U.S. Part of that pay came from a quick sale of Lotus stock by highly placed company executives right before they announced poor earnings. The SEC checked into the situation but so far has uncovered no wrongdoing.

If you'll just excuse me while I retire for a minute . . . Founder and Chairman John J. Cullinane ousted his handpicked successor and resumed the chairmanship of Cullinet Software after a seven-month retirement.

It looks great on paper. Supercomputer wanna-be Evans and Sutherland Computer's President David Evans said in April there was a chance that the company's high-powered processor may not work out. It seems the promising system had been simulated, but not built — even though the company was predicting shipments by now. The glitch stemmed from the inability of chip companies to manufacture the custom silicon simulated by the firm.

My kingdom for applications! After promising the delivery of OS/2 applications in the first quarter of 1988, a group of overly ambitious vendors backed down on their commitments, leaving more than 20,000 OS/2 buyers stranded.

Rookie goes back to the bench. In July, DEC unveiled Debit/Credit benchmark results showing that its systems outperformed those of IBM and Tandem. At that time, DEC said it would release a full report on the benchmarks in October; it subsequently decided to rerun the tests under an independent auditor before releasing them. Users are still waiting.

What Congress legislates, the IRS disintegrates. A well-intentioned congressional effort to clear up the controversy over when firms can hire technical service workers as independent contractors was turned into chaos by the IRS. A paragraph in the Tax Reform Act of 1986, Section 1706, has brought grief to many a contractor. Congress blindly passed the law without knowing how it would affect independent workers. The IRS further stirred debate with "private letter rulings" on individual cases. Clarity has yet to come to this situation, and the government is "studying" it further.

Dealing from more than one DEC. DEC's Database Storage Group signed an "exclusive" agreement with Relational Technology under which DEC would resell Relational's Ingres database tools. However, the arrangement did not exclude DEC from also signing a CMP agreement with Cullinet covering Cullinet's tools for RDB.

'It's my server!' 'No, it's my server!' Ashton-Tate apparently neglected to inform strategic partner Microsoft about an agreement that was intended to allow Novell to distribute a version of the Ashton-Tate/Microsoft/Sybase SQL Server tied into Novell's Netware. Microsoft Chairman Bill Gates expressed his profound displeasure at an industry gathering shortly before a press conference that had been scheduled as the centerpiece of Novell's Networld show, causing the press conference — and the deal — to be canceled.

Still crazy after all these clones. In John Sculley's autobiography, *Odyssey*, the Apple chief wrote how the firm would be crazy to sue other firms over graphical user interface technology. In March, Apple did just that against Microsoft and Hewlett-Packard.

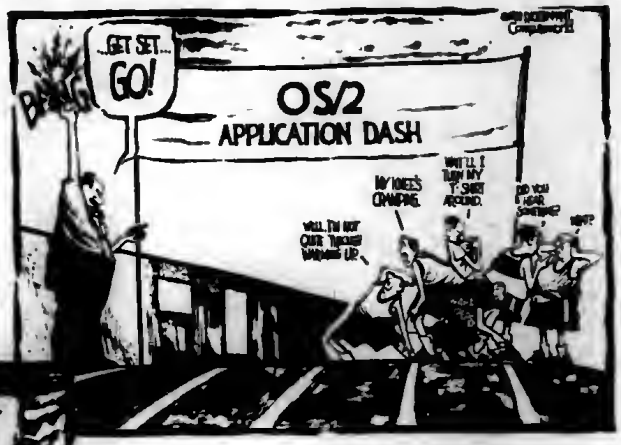
One too many strategic matchups? At the announcement of DEC and Ashton-Tate's joint development agreement, Ken Olsen introduced Ashton-Tate's Ed Esber as "Ed Esbie."

Too much of a good thing? Creator of Comdex and Interface, The Interface Group figured there was gold to be gathered after the demise of the once-humongous National Computer Conference. The group launched the MIS-oriented World Congress on Computing but killed it months after its debut. The typical audience of two dozen low-level MIS workers and foreign students at WCC sessions was far below the several hundred high-level attendees expected.

Coulda seen it coming. Despite some observers' comments about the inevitability of the outcome, too many companies chased too few customers in the once-hot minisupercomputer market, which lead to a painful shake-out. Problems ranging from slower growth to losses to layoffs reigned at Alliant, Elxsi, Multiflow and a host of other organizations; only Convex came through fairly unscathed. Perhaps most telling was the withdrawal of traditional minicomputer power Prime from its equity stake in minisuper start-up Cydrome.

Perestroika for profit. The bad news for Saxpy Computer was that one of its employees was charged with giving supercomputer technology secrets to the Soviets. The good news was that the publicity generated by the arrest gave the Silicon Valley start-up more instant name recognition than Regis McKenna could have produced in a year.

Do as I say, not as I do. IBM cut itself a healthy slice of humble pie in mid-September when it tacitly conceded to have underestimated the number of users who have no burning desire to scrap DOS and follow Big Blue's parade over to the Micro Channel Architecture.



Well, what do you know — we're No. 1 again! DBMS and hardware vendors somehow exhibited an uncanny ability this year to benchmark their products against each other — and all come out on top. Oracle, DEC, IBM, Cullinet and Tandem all scored the highest marks with their own versions of Debit/Credit. Bet these folks play a mean game of solitaire. •

Either I buy you or I sue you. The choice is yours. What's a Dbase cloner to do? Ashton-Tate first tried to buy — and then filed suit against — Fox Software for alleged copyright infringement. At the same time, the company rewarded other Dbase cloners — it bought a mini, RAM-resident Dbase clone from Apex Software and acquired its SQL technology from Wordtech. Would-be cloners are confused. Should they plan to buy a Ferrari with the proceeds of a nice sale to Ashton-Tate or should they save up for legal expenses?

LETTERS TO THE EDITOR

Think business

Your article "Downsizing threatens MIS influence" [CW, Nov. 28] addresses a threat only to those who suffer from a certain myopic condition that, unfortunately, has afflicted quite a few people. The implication that the influence wielded by an MIS manager is a function of the number and size of the computers he controls is frightening indeed.

The role of MIS is that of implementing effective solutions to business challenges. If we do not consider all solutions to a given problem — even those that do not involve a computer — then we are no better than the carpenter whose only tool is a hammer. Every problem will look like a nail.

MIS professionals have got to stop being back-office "byte-heads" and start being consultants to business. If we are afraid to implement technically simpler, lower cost solutions, then we will continue to proliferate technological solutions for their own sake. Doing that will ensure that we remain in the back office as functionaries and out of the boardroom as leaders.

Dennis L. Duffy
Senior Vice-President
Director of MIS
Burson-Marsteller
New York

Their side of the story

Douglas Barney recently wrote a column that began, "A while back, *The Wall Street Journal* kept trying to run a story about IBM, and IBM kept making them pull it" [CW, Nov. 14]. That's ridiculous.

IBM didn't "make" me pull the story, which said that IBM was developing a personal computer that contained an Intel 80386SX chip but used an AT bus. Nobody can force the Journal to kill a story.

I pulled the story on my own halfway through a press run because an IBM spokesman told me the story was flat wrong. IBM public relations people have always been straight with me, and it seemed to be possible that the development project had been canceled after my sources got their information.

The Journal also didn't "keep trying" to run the story. I killed the story once, during the press run for a Friday paper. I checked on Friday and found that the story was indeed accurate — the IBM spokesman had been misled, had misunderstood or was playing a semantic game with me. So we ran the story in our next paper the following Monday. If Mr. Barney had called, I'd have been happy to explain what happened.

I appreciate what Mr. Barney was trying to do to clarify confusion, but I think he wronged the Journal along the way.

Paul B. Carroll
Reporter
The Wall Street Journal
New York

Use the carrot, not the stick

The computer security world is inevitably put off by Morrisian escapades because of the threat posed to systems. It is not easy for us to look kindly on the benefits we reap from certain of these experiments, but I submit that we ought to attempt channeling the potentially valuable talents of the hacker subculture.

My suggestion is that the industry establish a fund to award prizes to discoverers and documenters of computer system security weaknesses. My hope is that the combination of the prize and the resulting recognition would be sufficient reward for the intellectual achievement and deter the recipient from implementing the documented threat.

I do not favor renouncing use of the stick but, as is often the case, the carrot could turn out to be an efficient first alternative.

Thomas R. Weinberger
Manager, Planning and Security
Information Systems Division
Memorial Sloan-Kettering Cancer Center
New York

Get it right the first time

I enjoyed reading Bob Stahl's In Depth article, "The ins and outs of software testing" [CW, Oct. 24]. I can certainly agree with his eight-point reality checklist for more efficient testing. However, I take exception to his statement: "Software's dismal reputation is largely the result of inadequate testing."

Software's dismal reputation is because of many factors like poor use of methods and tools and overconstrained schedules. Inadequate testing has little impact on software quality.

For developers to rely on testing to improve software quality is like doctors deciding to rely on better antibiotics to cure infection after operations. Joseph Lister (no relation) first described the sterile technique when performing surgery: Don't infect the patient in the first place. In 1988, we have Harlan Mills and Victor Basili, among others, describing "clean room" software development methods.

To improve software quality, let's concentrate on not infecting our creations in the first place, not on more efficient methods of curing illnesses we have caused.

Timothy Lister
Principal
The Atlantic Systems Guild
New York

Make them pay

It is no public secret that some computer users, including data processing personnel, are not willing to keep their password confidential. They do not hesitate to share it with their peers and subordinates (but not with the boss, of course).

The disclosure of passwords defeats the costly security feature. But those users do not feel they need to keep their passwords secret. They think it is OK to share passwords, and it is almost impossible to change their mind.

There is a technique we can try to convince people who do not want to keep their password secret: Provide the password with the facility to access their Personal Information System (PIS).

The PIS shows such personal information of the password owner as salary, grade, appraisal history, company loans, personal account and expense reports.

The owner of the password now will hesitate to share his password. Sharing it means sharing their personal data. If they still share it, there is only one more option we can do: Take it back.

Zamri Zaini
Dallas

All in the head

Gopal Kapur's article in a recent Reader's Platform [CW, Dec. 5] stomps heavily on the concepts presented in an earlier article. In the process, he uses an example that hardly supports his view.

He states, "Imagine a symphony in which the individual musicians are kept ignorant of the main score and know only their individual parts — one in which the conductor commits the entire score to memory and nothing at all is written down."

The problem here is that the first part is exactly how most symphonies work: The players are only given the parts they play. One reason is that it saves a lot of money to copy only the parts that each musician requires. Another is that musicians are proud of their ability to sight-read music and to jump from one piece to another.

In most cases, the entire concept of the playing is in the conductor's head. The score commonly does not contain detailed comments but serves as a reminder of the flow. Some conductors do not use a score.

Now we can wonder whether the rest of Kapur's self-serving comments — since he heads the Center for Project Management — are as far off base as they seem.

Mike Firth
Dallas

Oh no! Look out! It's Magscare!

Computer magazines love to beat the drum and ridicule vaporware. We all read with horror and dismay, over and over, how one of the big boys has again fallen short on delivery. I would like to enter a new category — Magscare. I just laid down another magazine with disgust at another story on how IBM has this monumental plot to overthrow the PC world by producing the Micro Channel Architecture.

I believe journalists are to report the news in an unbiased fashion. But it's obvious that we have a host of pundits out there who feel their mission in life is to crusade readers into computer sects. The means may in fact be destroying any enthusiasm or hope in the future of microcomputing.

Al Perkins
Publications Specialist
Embry-Riddle Aeronautical University
Daytona Beach, Fla.

Good to know

Regarding the column "Now you see it . . ." [CW, Nov. 21], it is nice to know that I am apparently doing it right. I have always insisted that applicants for programmer positions come back for a second interview, during which they meet and talk with as many of the programmers they will be working with as possible, even to the point of going to lunch with them at company expense.

This is to give me a chance to see what the chemistry is between the applicant and the staff. I would not hire an otherwise qualified applicant if it seemed he did not fit in well with the group.

The most surprising thing about Ms. Ruhl's article is her assertion that most managers do not routinely do this. I find this hard to believe.

James Hurvey
Programming Manager
The Columbus Dispatch
Columbus, Ohio

FRAMEWORK

Selling IS out of house is catching on — but beware

Firms want to hoard the competitive edge

BY CLINTON WILDER

"What's a wood products company doing selling high-technology services?"
From a Weyerhaeuser Information Systems marketing brochure

The idea of selling software applications or high-speed data network services outside one's corporation to generate profits can have an irresistible allure, particularly when the corporate world is demanding that MIS professionals be business strategists as well as technologists.

But a successful software or services marketeer is a very different business strategist than an MIS executive who has developed and deployed a strategic information system. In the last few years, most traditional MIS organizations that have sold products outside their parent companies have focused on software or services — disaster-recovery capability, for example — that are already available in the marketplace. Few are willing to risk losing any competitive advantage gained through a strategic system by spinning that system into a marketable product.

If outside buyers "can put in a system we've developed that would give them advantage against the Weyerhaeuser company, we have to place a limit. We have to be extremely careful," says Susan Mersereau, vice-president and general manager of Weyerhaeuser Information Systems in Tacoma, Wash.

With an increasing number of U.S. companies weighing strategic moves outside their traditional markets, the trend of MIS selling services outside parent organizations is likely to accelerate in 1989. In transaction-oriented industries like banking, large user firms such as Mellon Bank NA have sold data processing services for years. But within the past three years, key players in industries like manufacturing, construction and petroleum have joined in.

There are very few established rules in the user-turns-vendor game. Of the broad spectrum of U.S. companies that are playing, no two are doing it quite the same way. If there are any guidelines, they might be these: Plan such a move carefully, start out small and go slowly.

Aside from the basic elements of learning to market and sell in an industry as competitive as any other, becoming a vendor raises major, yet often subtle, relationship issues. If the relationship between MIS and internal end users is not clearly defined beforehand, for example, the jump into the computer industry can actually distance the MIS function from the corporate strategy it is trying to join.

"Selling outside services tends to detract from the main mission unless the [MIS] organization is doing an exceptional job taking care of internal customers," says Al Barnes, a Los Angeles-based managing associate of the Index Group, Inc., an information systems consultancy in Cambridge, Mass. "Most [MIS] organizations are not well served by going outside and becoming a vendor."

Yet many noncomputer companies are finding success by selling software and services; this success cannot always be measured by revenue growth or market share. Companies that assess the impact of their outside move on their internal customers see benefits on both sides.

"If you are only operating within a corporation, you're not in a selling mode; you're responding to demands," Weyerhaeuser's Mersereau says. "As a business, we've become much clearer on relationship selling — seeing [external and internal] users as partners."

Like several other firms' computer vending units, Weyerhaeuser Information Systems includes internal MIS, with service to users in Weyerhaeuser's various business units accounting for about 85% of its revenue. Mersereau, formerly the parent company's director of telecommunications, says she is well aware that Weyerhaeuser Information Systems' primary charter remains the parent company's internal needs, even if that means lost opportunities in the marketplace.

"If you really wanted to compete, you'd set up a separate commercial business," she says. "But you would lose the synergism and the resource utilization advantages."

A similar philosophy rules at Pennzoil Co.'s Strategic Information Services Co., or Stratis, formed in 1988 and located in Houston. "Internal customers are king," says Stratis Executive Vice-President Keith Eaton, "and for the foreseeable future, it will stay that way."

Stratis grew out of Pennzoil's ambitious 1983 decision to invest $50 million over a five-year period to revamp its MIS infrastructure — at a time when its competitors in the price-depressed oil industry were cutting IS spending. Pennzoil decided there was little incremental cost involved in going outside to sell its revamped oil and chemical industry applications and network-

Wilder is *Computerworld's* senior editor, computer industry.

based services such as electronic data interchange.

"We had already developed the software and made the investment," says Stratis President Patrick Manning. "There was very little downside risk."

Management involvement

In addition to a strong relationship with internal end users, the success of an organization's computer services business also hinges on the involvement of its senior corporate management. At Pennzoil, for example, the Stratis board of directors includes Pennzoil's general counsel and senior vice-president/controller.

"Senior management has to see themselves as owners of this business," the Index Group's Barnes says. "And you have to have a business plan. If you're just selling software outside, you're just selling — you're not a vendor, you're not really in the business."

The Bechtel Group, the San Francisco-based construction conglomerate, went through just such a thought process before it started up Bechtel Software, an independent business unit, in Acton, Mass., in 1987. Clients who used Bechtel's internally developed computer-aided engineering and project management software during a Bechtel project contract wanted to keep using — and therefore license — the software when the contract ended. In 1985, Bechtel allowed its various units to sell software that way, but senior management became concerned about the scattered approach taken to the idea of selling software.

Bechtel's Lucas

"They felt Bechtel should either be in the software business or not do it all," says Bechtel Software President John Lucas. "The way we were selling it was not a good way to protect our reputation as a company. We weren't set up to service the customer over the long haul. There weren't any clear guidelines for licensing, development and support issues."

As might be expected from its location — it is 3,000 miles from Bechtel headquarters — Bechtel Software is completely separate from Bechtel's internal IS organization. Lucas says the subsidiary maintains close ties with the software development teams within its parent company's MIS, but as of now, with about 40 customers, Bechtel Software has plenty to choose from among Bechtel's 800 proprietary applications.

"We're not trying to sell all the software Bechtel has ever developed," Lucas says. "We focus on those with commercial appeal."

Another advocate of the arm's-length approach between MIS and software selling is an early pioneer among computer users-turned-vendors, Westinghouse Electric Corp.

In 1969, the Pittsburgh manufacturer, having developed several IBM DOS/VSE utilities for its own MIS needs, saw a market for those utilities outside the company. Thus was born Westinghouse's Management Systems Software subsidiary, making it not only one of the first non-computer companies to sell software, but one of the first independent systems software vendors, period.

Agway's LaHood

One way a firm's internal users can help the vendor unit in to act as sales references. Such a relationship exists at Agway Data Services, Inc. (ADS), the computer services unit formed by the Syracuse, N.Y.-based agricultural products giant in 1987.

> "SENIOR management has to see themselves as owners of this business."
>
> AL BARNES
> INDEX GROUP

Like Weyerhaeuser Information Systems and Pennzoil's Stratis, ADS grew out of Agway MIS, and most of its sales come from Agway business units. ADS calls on those same units to be sales references when it seeks outside customers for its data communications, remote processing, disaster recovery and other services.

"The first thing that you've got to do is gain respect," says ADS President Dennis LaHood. "If you're not providing quality services to [your own] business, you're not going to be able to put forward the idea that you can provide those services to others."

Weyerhaeuser's Mersereau

To LaHood, the biggest hurdle in becoming an outside supplier is learning to sell. "The idea of marketing and sales is new to a traditional IS organization," he says. "But once you get past the point where a customer has developed an interest in ADS' capabilities, everything else is similar" to serving Agway business units.

But there is a potential dilemma with a noncomputer company selling software and services to its competitors: The buyer is ostensibly purchasing the computer technology to enhance his own competitive advantage.

The solution, companies say, is to assess whether competing products or services already exist in the marketplace. "With a service like disaster recovery, if customers don't buy from us, they go to a competitor," says Weyerhaeuser Information Systems' Mersereau. "The same is true if you're competing with off-the-shelf software."

Pennzoil's Stratis sticks to generic software in oil production, oil royalty revenue reporting and basic financial applications. "Ninety-nine percent of the software we sell is available out there in the marketplace, so there's no conflict," Manning says. Even if the software seller solves this competitive dilemma, there remains the possibility that internal and external customers' future needs may diverge, particularly in future enhancements and upgrades.

"There can be enough differences among your customers that you'll end up with lots of versions of the same application, and that can cause you to lose control of the base system," Barnes says. "If you're selling outside, the management process of enhancing a system becomes much more complex."

All these issues — and the overriding issue of the implications for a user organization's corporate mission of making the computer-industry-vendor plunge — should be assessed carefully beforehand by both MIS and top corporate executives. Some companies have hired outside consultants for help, as Agway did in 1985 when it contracted John Diebold to study its MIS strengths and market opportunities.

Not only is the strategic planning process of paramount importance in considering the question of vending MIS products and services, but the decision process itself can be invaluable — even if the answer is no. An MIS department's examination of whether it should go into business can be the best way to redefine its role in its firm's business.

"Top management has always had questions about IS; this is the opportunity to talk their language," Barnes comments. "Whether you sell outside or not may depend on your capabilities vis-a-vis your competition, but there's a benefit in thinking about it." •

Revolutionizing the working environment

Thomas Gerrity
Chairman and CEO
Index Group, Inc.

Computers and other information technologies provide three primary benefits to an individual, business function or an entire organization: efficiency, effectiveness and transformation. Understanding the nuances of each benefit sheds light on how computers have changed the way people and their organizations conduct business.

Today, given intense marketplace and competitive pressures, more and more companies are attempting to go beyond efficiency and effectiveness gains from information technology. They are embarking on truly transformational work changes involving the use of information and information technology.

Applications of information technology that create efficiency allow a user to work faster and at a significantly lower cost. An example of this would be automation of the clerical work in insurance claims processing.

Effectiveness applications result in better, higher quality work. For instance, when a large company with autonomous divisions implements a common purchase order information system, the system creates efficiency because it streamlines an onerous paperwork process. However, because it also enables the company to see, for the first time, its overall purchasing relationship with each supplier, there is an effectiveness benefit: The company can negotiate volume discounts.

Transformational benefits alter the fundamental way people, departments and even whole companies work with each other, creating a major competitive advantage. The information systems Otis Elevator Co. uses to improve the servicing of elevators speed the response time to service calls (efficiency), enable the company to provide better service because the system keeps historical service data on each elevator in use (effectiveness) and provide an ongoing diagnosis of elevators in use for preventive maintenance (transformation) and for locking in the service call.

One of the major transformational changes in business today is toward cross-functional integration and creating the flexible organization. In this area, communications and networking technologies are causing powerful changes in the way people communicate, work together on tasks and make decisions.

In an evolutionary way, technology is enabling people from a variety of business functions — marketing, sales, purchasing, manufacturing, administration, research and development and so on — to work much closer together in the provision of a product or service. Historically, these departments, and the people who worked in them, were segmented from others within the firm.

Tech breakdown

Today, however, communications and networking technology (and computers) are breaking down those barriers to interpersonal communication. The technology is making it far easier for various corporate constituencies to exchange information and work together, though not necessarily in close proximity, on projects.

Because the marketplace is becoming only more competitive and changing more rapidly, companies, more than ever, are looking to derive transformational benefits from information technology. Many of those involve using communications technology that facilitates the actions of people across functions to improve service, speed product development and share valuable information about customers.

In people's everyday work life, these changes will result in more employees working at home from a computer that can communicate with headquarters or other offices in the company and heavier use of electronic and phone mail. As new technologies come to the scene, we will leverage them to further revolutionize the way we work. •

The best thing next to an IBM PC. Or any PC.

Model 310/360

The economics of IBM ASCII displays.

The affordable Models 310 and 410, when equipped with cartridges, offer PC terminal function for all multi-user PCs. That includes the IBM® RT-PC™ computer and the IBM PS/2™ family.

What's more, Models 310 and 410 offer many popular emulations. Optional cartridges provide features such as concurrent DEC™ and PC connectivity, and auto dial. Both models come with a 3-year warranty. Add an IBM Maintenance Agreement, and you'll get five years of IBM service for just $54.

The ergonomics of IBM ASCII displays.

They're not only economically attractive, they're easy to look at. Flat 14" screens offer non-glare viewing. Green or amber/gold short-persistence phosphors produce crisp character resolution. And each model uses the advanced 102-key IBM keyboard.

Want more information? Just ASCII.

For a free brochure and to find a distributor near you, call 1-800-IBM-7257 ext. 89. Or call your IBM Marketing Representative.

IBM®

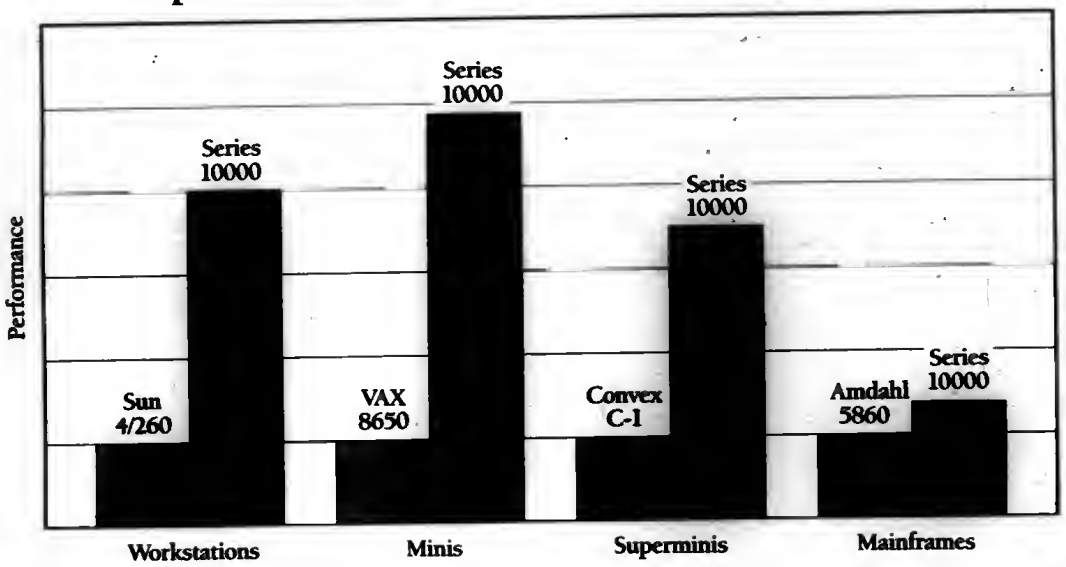
Model 410/460

IBM is a registered trademark, and PS/2 and RT-PC are trademarks, of IBM Corporation. DEC is a trademark of Digital Equipment Corporation. © IBM 1988.

The Apollo Performance Challenge

If performance is measured by how fast an application runs,

Apollo's Series 10000 Beats All Computer Classes



then it looks like the race is over.

A little over a month ago, in a series of demanding benchmark tests, the new Apollo® Series 10000™ overwhelmed some of the industry's most acclaimed computers.

However, we're the first to admit that benchmarks and actual applications are two entirely different things. So we challenged people to bring us their toughest applications and observe the Series 10000's power for themselves.

The results were something to see. For in more than 50 applications pitting the Series 10000 against workstations, minis, superminis and mainframes, the winner was always the same.

Consider just four examples. Against other workstations, the Series 10000 ran an international tire manufacturer's isothermal flow application six times faster than the Sun 4/260.

Against Digital's VAX® 8600 mini the Series 10000 ran a papermill machinery designer's matrix multiplications 7.25 times faster.

When an earth resources firm ran a Fortran-based mathematical program measuring seismic data transference, the Series 10000 overpowered a Convex C-1 by three times.

Even a mainframe failed to outperform the Series 10000. When a software engineering firm tested a circuit simulation program on an Amdahl 5860 and the 10000, the latter outran the giant by a factor of 1.4.

Your application can be next. Call 1-800-323-1846, and in Massachusetts 1-800-847-1011 or write Apollo, 330 Billerica Road, Chelmsford, MA 01824. We'll run your application so fast, it will take your breath away.

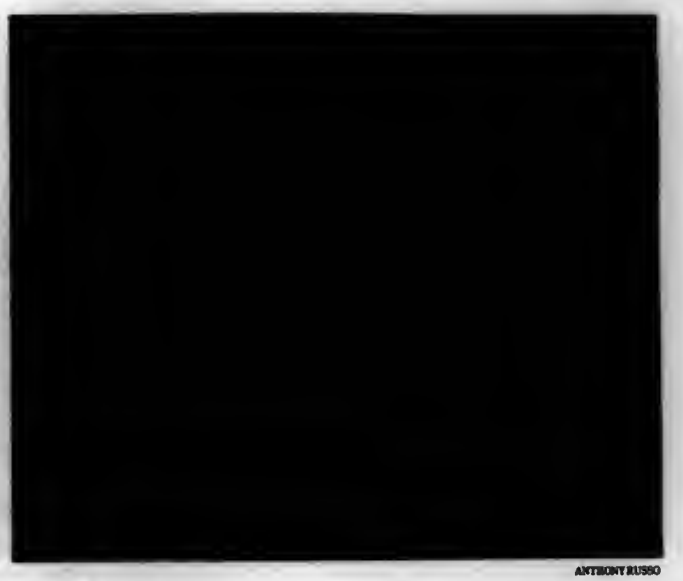
apollo

Apollo is a registered trademark and Series 10000 is a trademark of Apollo Computer Inc. VAX is a registered trademark of Digital Equipment Corp

Downsizing an opportunity and a risk

LAN-based solutions may easily overtake centralized minis by 1992

BY MICHAEL ALEXANDER



ANTHONY RUSSO

Corporate America is in the midst of a battle to become lean and mean, even while many companies are gulping down others like fish in a feeding frenzy. But the way many corporations are trimming the fat is not by divesting unprofitable divisions but by downsizing their MIS operations.

"Basically, downsizing is the idea of taking systems that may have been on a mainframe or minicomputer, perhaps with complicated connections into other systems, and surgically removing them and placing them on personal computers," explains Theodore Klein, president and founder of Boston Systems Group, a consulting and systems development firm headquartered in Boston. "It could also mean shutting off the lights in the data processing center, disassembling [the center] and dispersing it throughout the company."

Klein estimates that 20% to 25% of Fortune 1,000 companies will be downsizing their information technology systems in 1989, and 40% to 50% of those companies will be downsizing their systems the following year. He believes that the downsizing process will be completed in the mid-1990s, when virtually all of the top corporations in the nation will have decentralized at least a portion of their computer operations.

Downsizing from mainframes to micros on local-area networks is reshaping the minicomputer industry, says The Sierra Group, Inc., a market research firm based in Tempe, Ariz. In 1988, the group surveyed more than 2,000 companies and found that 30% of them are using PC networking technologies, up from 24% in 1987.

Based on current growth rates, LAN-based solutions may easily overtake centralized departmental minis by 1992; by 1995, networked topologies will represent the larger share of installations, The Sierra Group forecasts.

There are at least two fundamental reasons behind this rapid adoption of downsized systems. The first is that the price/performance ratio of personal computers is improving virtually by the nanosecond, leading some analysts to predict that as much as 80% of corporate computing power will be on desktop systems by the mid-1990s.

In only a few years, it will not be uncommon for many white-collar workers to have mainframe computing power on their desk tops, says Don Tapscott, an expert on office automation and end-user computing for the DMR Group, Inc., a management consulting firm with offices throughout North America.

With cheaper and more powerful desktop computers will also come machines and multimedia interfaces that are more "people-literate" than the other way around, Tapscott points out.

The end-user revolution

Perhaps the most potent force fueling the downsizing engine is the rise in end-user computing. Consider that a majority of white-collar workers will already have had 10 to 15 years of experience working with personal computers by the mid-1990s. These same workers have moved from experimenting with PC technology to applying it skillfully in ways that simply were not thought of only a few years ago.

Indeed, in many corporations, end users have detoured around the applications backlog in many MIS shops and are actively developing sophisticated applications on PCs.

"In the old days, things were expensive and expertise was thin, so it made sense to centralize and take advantage of the economies of scale," Klein says. "But companies are looking at downsizing more, now that PCs are so widespread and end users have built up their computer expertise."

Once end-user computing has taken hold in a corporation, senior managers begin thinking more seriously about downsizing, he says.

"Senior managers often start looking at downsizing as a way to cut bloated bureaucracies, which are often in MIS departments," Klein says. "In other cases, it starts growing out of end-user or departmental expertise. End users begin rebelling against paying exorbitant mainframe charges, and there is a bottom-up swell that leads to change."

"Mainframes are expensive, and the ongoing costs are pretty hefty — that's what typically gets information systems managers thinking about downsizing," says Randy Gottwaldt, who manages information systems at Imprimis Technology, a Minneapolis-based disk drive manufacturer. "Also, if you have a lot of stand-alone PCs scattered around, management starts looking for ways to make better use of them."

Downsizing can be of strategic importance to a company, perhaps to enhance its competitive edge, Gottwaldt says: "For us, that was a significant consideration. Depending upon your product, you may need to spread the costs around quite a bit, especially in a high-volume low-margin business like this one. The savings of downsizing are fantastic.

Alexander is a *Computerworld* senior editor, microcomputing.

"Many businesses want to do something radical because of a change in the business climate, say, when they go from facing competition on a domestic level to competition on an international level," he adds. "That creates a lot of pressure to succeed, and downsizing can help."

Imprimis Technology, which is wholly owned by Control Data Corp., decentralized a manufacturing application on the mainframe to a local-area network, Gottwaldt recalls. The project was started three years ago.

A successful transition requires the enthusiastic endorsement of upper management, he says: "They have to be visible to end users. Their having a good attitude about the change also helps because it filters down through the ranks."

Information services managers who have successfully downsized cite numerous benefits, not the least of which are the potentially huge cost savings and added flexibility that comes from putting PCs instead of terminals on desk tops.

"We spent a bit less than $100,000 to buy 75 personal computers," said one IS manager who asked not to be identified. "That included everything — cables, network cards, software and several other things. That's about what we were spending per year in mainframe fees alone."

Cost-cutting the key

The primary consideration was the cost savings, concurs Roger Goss, coordinator of system interface at Eastman Kodak Co. in Rochester, N.Y. He recently completed a downsizing operation that replaced a mainframe publishing system with a local-area network of IBM Personal Computer ATs and Apple Computer, Inc. Macintosh SEs in the photographics products group publication division.

"We eliminated an annual fee and used the money to buy new computers and get new technology in the process," he says. "The price of the whole network, including hardware and software, was about equal to the cost of one year's mainframe fee."

A second — though equally critical — consideration was that the previous system, used to publish manuals and documentation, was "not friendly to someone who needs to create a lot of words," Goss says. "It used proprietary software, and we had no flexibility. Now our systems come with whatever software we want, and if we're not happy, we can switch."

The network works like a charm, day in and day out, Goss says. "The only problem came when we were upgrading the network software, but even then, during the time that the network was down, people were still working," he says. "The IBM PC AT users could not do any printing, but they knew that in advance and were able to pull off the files that they needed for that. The Apple Macintosh users were able to continue right on because they were connected to laser printers on an Appletalk network."

The modularity of the network — the ability to swap hardware and software at will — is one of the key benefits to downsizing, Goss says.

"You can swap a PC AT for a Macintosh or vice versa, and you only have to train one person at a time if that is all you are able to do," he points out. "Where budgets are tight, you don't have to buy everything in one fell swoop. Those are definite advantages."

PCs, servers, software and related networking products are available from a variety of sources, and MIS managers can leverage competitive differences among suppliers to increase their buying power, according to several MIS managers.

Incompatible platter

Downsizing is not without a downside, however. When end users are left without guidelines, they are apt to assemble a smorgasbord of incompatible LAN environments. Their purchases may be naive and redundant, ultimately putting a heavy burden on MIS resources.

"Our biggest mistake was that we didn't follow through properly on restructuring," says Gary Biddle, corporate vice-president of management information at American Standard, Inc. in New York. It cannot be assumed that systems become simpler when they get smaller, he warns.

Don't forget applications

"If you are going to downsize, you can't forget to downsize the applications as well," Biddle says. "In one instance, we had a system supporting 14 levels of management, where really there should only have been five. There is more to it than just identifying a few flashy applications to downsize."

Downsizing is not without ramifications for the data center in ways that may be unexpected by many IS managers. The influence that IS holds in the corporation disperses as rapidly and as widely as the computer systems they have been charged to decentralize.

"The changing information economics that will put 10 MIPS on a desktop will mean there will no longer be need for a central computing facility," Tapscott says.

"The organizational structure will change," Klein adds. "Senior management will need to cope with such issues as deciding to whom the company's MIS professionals will report. Will they report to a CIO or to the department head where the network is located, for example?"

With the downsizing of computer systems could conceivably come a downsizing of the data center, Tapscott explains. In the extreme point of view, there may no longer be any need for a data center.

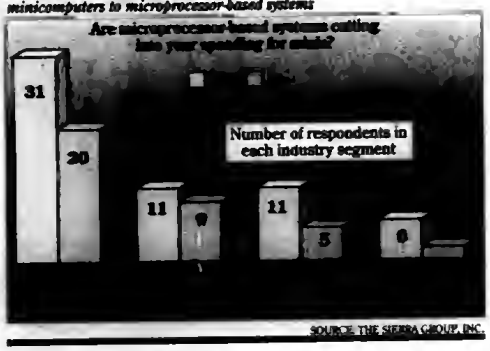
There is certainly a relationship between the two — downsizing systems and downsizing the data center — but the issue is one of finding a balance between dispersing the technology throughout the organization and keeping the data center, Klein says.

One of the key roles of the data center will be to ensure connectivity and to build the platforms on which these dispersed systems will sit, the analysts agree. MIS will control and manage the connectivity of the company's networks and set guidelines and methodology for using the network.

"The analogy that I use is as follows: When the first automobiles were introduced, you had to be a big strong hefty man with a knowledge of mechanics to drive one, so there weren't many on the road," Klein says. "Now, anybody can do it. The MIS department will be needed to lay down the roads, put up the signs and even put in a police unit. But they won't be needed to build the cars any more." •

New loyalties

Better PC price/performance and end-user demand were cited by MIS executives surveyed as the forces behind their diversion of funds from minicomputers to microprocessor-based systems



SOURCE: THE SIERRA GROUP, INC.

Discovering tools for information management

Charles Marum
Senior Vice-President and CIO
Sears, Roebuck and Co.

The competition within retail, insurance, real estate and financial services is intense. We at Sears, Roebuck and Co. must be able to anticipate — or at the very least react quickly to — changes in our business environments to stay ahead of the competition.

Effective communications and information management is essential. Our people must have quick access to information whenever and wherever they need it. They also need the ability to access that information in whatever format they want so that it is useful to them.

Information technology is helping us to respond to these requirements at Sears; as a result, major changes are taking place in the way we do our work.

Modeling tools are allowing us to see the impact of our ideas without actually having to implement them first. Forecasting tools help us anticipate our markets so we can be active rather than reactive. We expect both sets of tools to become even more sophisticated in the future.

Electronic mail is already a regular part of our everyday lives. We send and receive messages, letters and documents throughout the organization at our convenience — instantaneously, any time, day or night, to and from any location. Personal computers and portable CRTs even allow access from our homes or while traveling. Because the correspondence can be stored and retrieved at later dates, paper is largely being eliminated.

Finding alternatives to handling the ever-growing mountain of paper is increasingly important. Paper itself is not only expensive; it is also difficult to distribute, file, store, retrieve and manipulate manually. Internally, our people are now receiving many reports on-line. The reports are available for viewing moments after they are generated.

We are also starting to experiment with image-management systems, which can capture many images such as graphics in addition to text. We believe these systems will become even more important to us in the future as their prices come down and their capabilities improve.

The vast amount of information we collect is being stored in subject area databases, most of them relational. This storage allows us to manage the information independent from applications to assure that it is consistent in meaning and structure and can be shared across the firm.

In addition to stand-alone processing, end-user computing tools are already providing our business users with access to these databases and, thus, more flexibility and control of their information systems needs. They can readily view, manipulate and print the information they desire. They can download information from the mainframe databases to their PCs for local processing in various formats such as spreadsheets.

All managers are now responsible for directing systems development just as they direct the other product, service and cost aspects of their businesses. They can no longer ignore the use of information technology; it is now part of their job rather than strictly a responsibility of the MIS organization.

Information technology has become a strategic resource on a par with people and capital. It is not only a means to reduce cost; it can also be thought of as an investment to create future increased revenues as well. Just as business goals drive the development and use of information technology, imaginative use of information technology can create business opportunities.

Our challenge in the future will be to keep abreast of the rapidly changing technical environments so that we will be in a better position to look for strategic use of information technology. Our work environment will certainly continue to change as a result. •

Reading someone else's copy of Computerworld?

YES, I want to receive my own copy of COMPUTERWORLD. Please send me 51 weekly issues for only $39.00* — just 76¢ per copy. In addition, I'll receive FREE bonus issues of COMPUTERWORLD FOCUS.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48

* U.S. Only. Canada $110. Central/South America $135. Europe $195 (Airmail), all other countries $295 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   10. Manufacturer (other than computer)
   20. Finance/Insurance/Real Estate
   30. Medicine/Law/Education
   40. Wholesale/Retail/Trade
   50. Business Service (except DP)
   60. Government — State/Federal/Local
   65. Communications Systems/Public Utilities/Transportation
   70. Mining/Construction/Petroleum/Refining/Agric.
   80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   88. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   90. Computer/Peripheral Dealer/Distributor/Retailer
   79. User Other _____
   85. Vendor Other _____ (Please specify)
2. **TITLE/FUNCTION** (Circle one)
   IS/MIS/DP MANAGEMENT
   19. Vice President, Asst. VP
   21. Dir. Mgt. Suprv. IS/MIS/DP Services
   23. Dir. Mgt. Suprv., of Operations, Planning, Adm. Services
   23. Dir. Mgt. Suprv. Analyst of Systems
   31. Dir. Mgt. Suprv. of Programming
   33. Programmer, Methods Analyst
   35. Dir. Mgt. Suprv. OA/WP
   36. Data Comm. Network/Systems Mgt.
   OTHER COMPANY MANAGEMENT
   11. President, Owner/Partner, General Mgr.
   12. Vice President/Asst. VP
   13. Treasurer, Controller, Financial Officer
   41. Engineering, Scientific, R&D, Tech. Mgt.
   51. Sales/Mktg. Mgt.
   OTHER PROFESSIONALS
   60. Consulting Mgr.
   70. Medical, Legal, Accounting Mgt.
   80. Educators, Journalists, Librarians, Students
   90. Others _____ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
   A. Mainframes/Supermins
   B. Minicomputers/Small Business Computers
   C. Microcomputers/Desktops
   D. Communications Systems
   E. Office Automation Systems
   F. No Computer Involvement

E4901-0

Reading someone else's copy of Computerworld?

YES, I want to receive my own copy of COMPUTERWORLD. Please send me 51 weekly issues for only $39.00* — just 76¢ per copy. In addition, I'll receive FREE bonus issues of COMPUTERWORLD FOCUS.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48

* U.S. Only. Canada $110. Central/South America $135. Europe $195 (Airmail), all other countries $295 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   10. Manufacturer (other than computer)
   20. Finance/Insurance/Real Estate
   30. Medicine/Law/Education
   40. Wholesale/Retail/Trade
   50. Business Service (except DP)
   60. Government — State/Federal/Local
   65. Communications Systems/Public Utilities/Transportation
   70. Mining/Construction/Petroleum/Refining/Agric.
   80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   88. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   90. Computer/Peripheral Dealer/Distributor/Retailer
   79. User Other _____
   85. Vendor Other _____ (Please specify)
2. **TITLE/FUNCTION** (Circle one)
   IS/MIS/DP MANAGEMENT
   19. Vice President, Asst. VP
   21. Dir. Mgt. Suprv. IS/MIS/DP Services
   23. Dir. Mgt. Suprv. of Operations, Planning, Adm. Services
   23. Dir. Mgt. Suprv. Analyst of Systems
   31. Dir. Mgt. Suprv. of Programming
   33. Programmer, Methods Analyst
   35. Dir. Mgt. Suprv. OA/WP
   36. Data Comm. Network/Systems Mgt.
   OTHER COMPANY MANAGEMENT
   11. President, Owner/Partner, General Mgr.
   12. Vice President/Asst. VP
   13. Treasurer, Controller, Financial Officer
   41. Engineering, Scientific, R&D, Tech. Mgr.
   51. Sales/Mktg. Mgt.
   OTHER PROFESSIONALS
   60. Consulting Mgr.
   70. Medical, Legal, Accounting Mgt.
   80. Educators, Journalists, Librarians, Students
   90. Others _____ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
   A. Mainframes/Supermins
   B. Minicomputers/Small Business Computers
   C. Microcomputers/Desktops
   D. Communications Systems
   E. Office Automation Systems
   F. No Computer Involvement

E4901-0

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

FRAMEWORK

Integrated net management: a Pandora's box of choices

The vision of mixed environments often turns into a manager's horror

BY PATRICIA KEEFE

The current state of integrated network management brings to mind the rock 'n roll lament that "you can't always get what you want." But what really kills today's frustrated network managers is that, try as they might, sometimes they still can't get what they need. And in a way, they have no one to blame but themselves.

In their rush to get out from under the tyranny of single-vendor solutions, users are discovering that mixed standards and multivendor environments have created a Pandora's box of network management nightmares. In short, you can't have your cake and eat it too — at least not today.

BLAIR THORNLEY

"I talk to two or three users a day who are screaming their heads off over this. They are sick of having a bunch of tools that don't jell," says Jeremy Frank, program director at the Gartner Group, Inc., a Stamford, Conn.-based market research firm.

What many users say they want, what some industry pundits say is coming and what vendors swear they will provide — someday — is an integrated, comprehensive centralized network management package.

User pressure has succeeded in forcing vendors to at least develop and publish blueprints for network management systems. "Users have made network management a prerequisite for consideration in almost every [request for proposals]," says Jeffrey Kaplan, director of network and professional services for The Ledgeway Group, Inc., a Lexington, Mass.-based consulting firm.

But the resulting architectures have amounted to just so much paper and ink. "There's been no real progress this year. You can't buy any of this stuff, can you?" asks Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C.

So the vast majority of users such as Dennis Turek, a software analyst with Anheuser-Busch Companies, Inc. in St. Louis, are forced to continue to resort to "roll-your-own" network management. "Users absolutely have no choice," Frank claims.

Fortune 1,000 data communications managers surveyed earlier this year by International Data Corp. (IDC) in Framingham, Mass., revealed that 26% — the highest percentage responding — plan to develop their own network management systems.

"The smart people have to fashion their own [management system]; the people who wait for one to come by will fall by the wayside," predicts American Cyanamid Co.'s Joseph Kascik, a manager of network planning for the Clifton, N.J.-based company, which has a worldwide virtual integrated voice/data network.

Pulling in the reins

It is ironic that in this age of open network hype, users now find that it behooves them to begin backing away somewhat from their eager forays into multivendor connectivity.

Of course, no one is proposing a return to proprietary vendor systems. But where users are already grappling with long-term network strategies and standards, it is easy enough for some MIS departments to begin pulling in the reins on diverse network implementations. The goal is to winnow a wealth of competing networks down to two or three manageable systems.

"There's a strategic direction here to move three networks into one," admits Ron Robeck, manager of technical services at Affiliated Bank Services in Thornton, Colo. Affiliated has standardized on one network management package but uses three different networks mostly because of the requirements of different hardware.

Anheuser-Busch runs two networks, one from IBM and one from Prime Computer, Inc. "They are pretty separate right now, but we're looking at how to tie them together," says Turek, who adds that his department is looking hard at LU6.2. Each network maintains a database that must be kept in synchronization with the other.

Turek notes that it would be a lot easier to run one database on one network.

After consolidating networks, the next step for users is to select a network management approach. Most of what is out on the market today seems to feature compatibility with one of two adversarial camps: IBM's host-based Netview management system and the Open Systems Interconnect (OSI) network management standard, CMIS/P.

Lacking one be-all and end-all management system, users are further faced with dividing their choices into one of two approaches: a single-vendor solution or a mix of network management tools that may or may not interoperate.

Users have to be careful to weigh short-term goals against long-term needs. The wrong technology decision could boomerang painfully at some future date.

"We try to purchase management equipment with an eye toward interacting with the systems that exists and with what we know we'll have to acquire," says Jeff Harris, director of planning and technology for Mattel, Inc. in Hawthorne, Calif. Mattel is in the midst of revamping a worldwide "kludged" network that had no real network management in an effort to integrate voice, data, facsimile and telex.

The first thing users see when they begin their quest for

Keefe is a *Computerworld* senior editor, networking.

Choose this,

Everyone's computing needs are unique. Which is why different people choose different solutions. And why so many diverse computing environments are being used today.

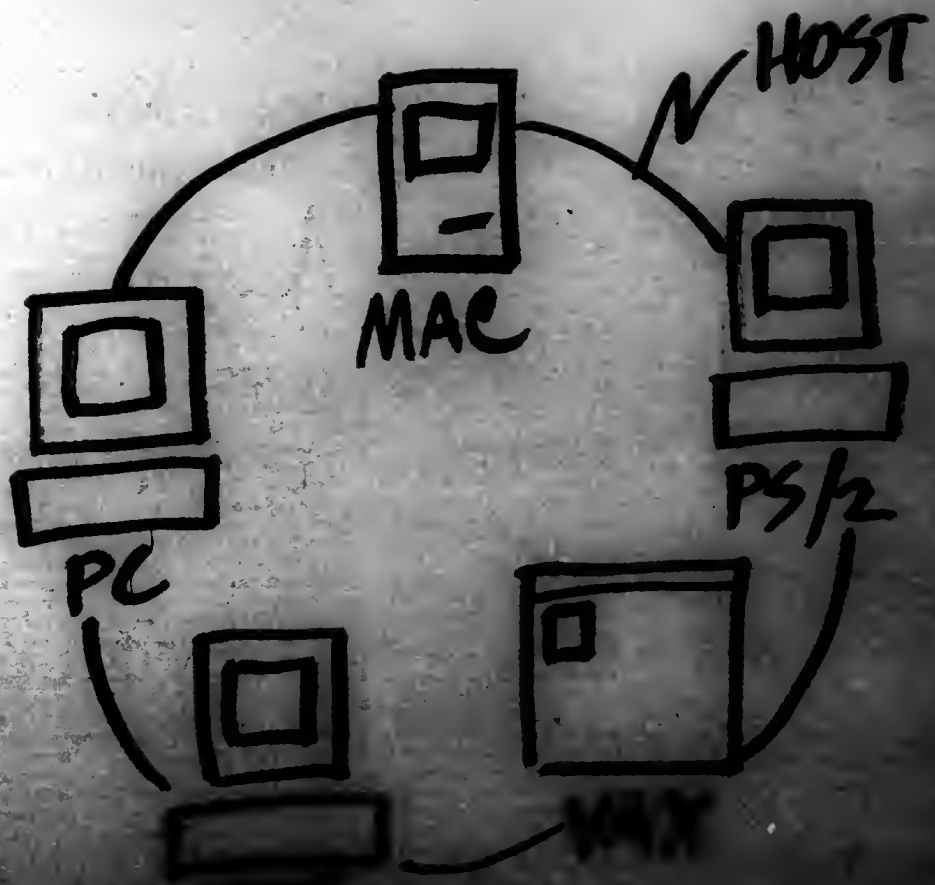
While this variety of solutions makes it easy for users to meet their needs, it presents some problems. Like sharing information between incompatible systems. The kinds of problems facing more and more companies as their information systems grow and diversify.

Novell means freedom. Fortunately, you can solve those problems by making one simple choice: Novell. Novell's NetWare® operating system software supports a myriad of computing environments.

That means you have the freedom to network everything from PCs to Macintosh, VAX to PS/2, 386 to mainframe host systems. So everyone can use the workstations they choose, without changing the way they work.

The power to choose. With NetWare, Novell gives you the most powerful combination of network performance, security,

© 1988 Novell Inc., World Headquarters, 122 East 1700 South, Provo, Utah 84601 (801)379-5900



and you can choose all of these.

functionality and system reliability available. Plus you get the power to transparently connect to any of the more than two million users worldwide who have already chosen NetWare.

And as your computing needs expand, the network will grow with you. Giving greater networking capability and allowing you to connect to new environments.

The freedom to choose. Exercise your freedom to choose the desktop environment that best meets your needs. Choose the networking power of NetWare. See your Gold Novell Authorized Reseller, or call 1-800-LANKIND.

For more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter the access code NVFRE7.

NOVELL

For network solutions, you should be seeing red.

network management is a veritable sea of choices bobbing with different network platforms, all festooned with "open interface" banners.

According to an April survey by Forrester Research, Inc. in Cambridge, Mass., users are targeting their dollars at IBM's Netview, AT&T's Unified Network Management Architecture, OSI and Digital Equipment Corp.'s Enterprise Management Architecture (EMA). Even so, the market is so fragmented — and clearly still up for grabs — that the leading segment in the survey was the "other" category, which garnered the largest purchasing share, 37%.

Fitting systems to needs

A checklist for maximizing network performance

- Assess the entire network from a macro perspective
- Define each network component in terms of its level of network management and control; work out how the network can be managed from a central point of control
- Calculate the cost of each element and decide how long any one can remain unproductive before it starts costing the company
- Review line costs and equipment placement to determine whether reconfiguration can reduce lines or take better advantage of existing lines
- Review current applications to see if existing equipment should be replaced by equipment more appropriate for the application
- Review current network management and control offerings to determine whether the existing equipment can be upgraded
- Submit several requests for proposals to network equipment suppliers; include a separate section directed to available network management and control functions to allow cost comparisons
- Perform a cost analysis of any proposed equipment additions; plan for growth by forecasting changing network requirements
- Take a phased approach to minimize cost and get the best network performance

SOURCE: INPUTRON SYSTEMS CORP.
CW CHART

While they wait for vendors to flesh out their strategies and support for multiple environments, many users are taking a deep breath, crossing their fingers and plunging forward into homegrown solutions.

One approach calls for selecting a few areas to monitor — for example, session management, physical-layer management and packet-switch nodes. A mix of network management systems usually does the job, but more often than not, the systems are completely separate.

"From a network control perspective, we basically are going for the best equipment that we can find for the particular function, but it has to interoperate with what we've got," Harris says. His IBM Systems Network Architecture network is standardizing on IBM's Netview, with a Datapoint Corp. server functioning as the gateway to all non-SNA systems.

"We've made some pretty cavalier decisions in terms of moving forward," he points out. "I'm afraid that one of these days it will turn out that one of our primary [business partners] has a whole office filled with Wang or something, and I'll go 'Oops!' When that happens, I'll have to get real smart, real fast."

About 50% of the IDC survey respondents said they currently use from one to three network management systems. Roughly 30% use between four and six systems; another 2% use more than six; and about 10% use nothing at all.

Interconnection futures

Many users answer the challenges of interconnection or interoperability by resorting to reentering a printout from one system on another system's console.

In lieu of concrete offerings from vendors, users are adding some elegance to the "swivel-chair" approach, says Marvin Chartoff, an analyst with Ernst & Whinney in Fairfax, Va. In other words, move all the consoles for the different systems together, allow them to dump data into the same printer and start gearing up for automated operations.

WHILE THEY WAIT for vendors to flesh out their strategies, many users are taking a deep breath, crossing their fingers and plunging forward into homegrown solutions.

A number of vendors are taking steps to provide for interconnection, but again, they're talking futures. For example, Hewlett-Packard Co. and AT&T are publishing the specifications to their management architectures. IBM released the specs for Netview/PC to third parties, and OSI cheerleader DEC indicated it may provide specs to its recently announced EMA sometime next year.

All these companies have promised to migrate their systems to the OSI Network Management standard — once it becomes finalized, which may be as much as three to four years away — or to at least support the OSI communications interface.

Yet even OSI provides no guarantee of interoperability. As users of CCITT X.400 gateways are finding to their increasing dismay, just because two products comply with the standard doesn't mean they can talk to each other. It also means users run the risk of getting locked into proprietary implementations of these standards.

The solo approach

The alternative approach is to go with a single-vendor solution. "I believe the one-vendor philosophy is a little easier to coordinate," Affiliated Bank Services' Robeck says.

But this approach is not always the most realistic one. "It's true that staying with one homogeneous approach is easier on development overhead and system administration, but given the real world, in most installations there is a real need for more interoperability," says Clare Fleig, director of research at International Technology Group. She sees the single-vendor approach as more suited for larger, terminal-based systems.

Users in this camp risk potential lock-in and commitment of the future of their network to one vendor, Chartoff says. "You can also eventually restrict the types of applications that you support," he adds.

Actually, most network management systems combine vendor-supplied network hardware and a mix of third-party packages and internally developed applications and systems.

For example, the New York-based Financial Industry Standards Organization (FISO), a consortium of some 20 financial services companies that are trying to develop a common communications standard for their industry, is planning to use a mix of OSI and proprietary networking solutions.

But some users such as Cyanamid's Kascik view standards with considerable suspicion. "I'm not waiting for OSI," he maintains. "Standards would be nice, but vendors won't allow real good integration unless you are willing to write hooks into their systems."

Regardless of which way a user turns, it is imperative that they start moving now, Frank says, warning, "If you don't start today, you won't have a prayer. The average 3090 generates 1,000 messages per second. The average network control operator can read one per second and act on one every two seconds. Consider that CPU activity is supposed to go up 12% a year. So if you think things are out of hand now, in a couple of years it will be worse."

Users can begin to lay the foundation for network management even if they are undecided about which direction to take, Gartner's Frank says. "You have to realize that all network management decisions today are tactical — the strategic stuff is five years out."

He advocates organizing "tedious, low-level, time-consuming tasks," such as the following:

- Combining databases, or at least making multiple databases appear as one entity.
- Starting now to build a pool of network management specialists and cross-training at every opportunity.
- Knowing what you have, where it is and what you need.

Moreover, users should determine what they really need to manage their networks. "Vendors can only provide a reasonable solution to the extent that they get reasonably stated problems," notes Thomas Nolle, president of Haddonfield, N.J.-based CIMI Corp.

Regardless of the path that they take, users need to make certain that their chosen management strategy will help them control their networks rather than give vendors s way to control the account.

Advises Nolle: "Select the network management system that seems like a fit to your problems, even if it's not integrated. It's much better for you than one that is beautifully integrated but does not meet your needs." •

Which is the key network management system?

A bewildering array of architectures are vying to be *the* central network management system that will control and monitor users' enterprise networks. Vendors have been announcing these products at a steady clip during the last two years. The bad news is that most of them are pure vapor.

On the upside, the suppliers of many of these so-far-transparent offerings plan to either publish their technical specifications or at least open up their systems to other vendors' products via an Open Systems Interconnect (OSI)-compliant interface. The following is a list of some of the key network management architectures:

- **OSI's Network Management Forum**, which is developing specifications to ease multivendor network management interoperability. The profiles for OSI Layers 1 through 6 and the first three sublayers at Layer 7 — including the draft OSI proposal for Common Management Information Services and Protocols — should be set by the end of 1988.

  There are at least 33 members, including AT&T, Hewlett-Packard Co. and Northern Telecom, Inc., IBM and Digital Equipment Corp. do not participate.
- **IBM's Netview**, a host-based network management umbrella for a range of Systems Network Architecture monitor and control tools. IBM has said it will support an interface to OSI. Netview/PC is the mechanism by which IBM supports non-SNA networks. Both products were announced in May 1986.
- **DEC's Network Enterprise Management Program**, announced in September 1988, reportedly will provide users with a single, comprehensive solution to managing multivendor, geographically dispersed, enterprisewide environments. The Enterprise Management Architecture is said to provide a foundation for the integration of OSI standards.
- **AT&T's Unified Network Management Architecture**, a three-tier blueprint that reportedly will let users manage nine areas, including fault isolation, performance, security and integrated control. It was announced in September 1987.
- **Cincom Systems, Inc.'s** Netmaster is viewed as a modular clone of Netview, although users and some analysts maintain it is easier to use, has more features and is more easily tailored to a particular network's needs. Introduced in April 1984, it did not really take off until 1986 when IBM entered the market with Netview.
- **HP's Openview** is described as a comprehensive, integrated set of software, hardware and support products that embrace the OSI network management architecture. The system features a graphical interface based on Microsoft Corp.'s Windows that reportedly will provide network managers with a standard integrated way to manage multivendor networks. It was announced in March 1988. •

PATRICIA KEEFE

INTERIOR

CIOs' lives are turned topsy-turvy

PETER KUPER

Turnover rate accelerates as the title seeks definition

BY JAMES CONNOLLY

More than a few eyebrows were raised — and, presumably, more than a few resumes were checked — last spring when a survey of chief information officers revealed that more than one-third of their predecessors had been fired or demoted from their jobs.

That survey, by Touche Ross & Co., might help CIOs argue for hazardous duty pay. The researchers uncovered an annual CIO turnover rate of 17% leading up to 1988 and other signs indicating that "CIO job security" is a contradiction in terms. Several observers guess that the 1988 rate will double that figure.

CIOs — whether they possess the formal title and act as corporate information czars or merely rank as top computer executives — are changing jobs in an atmosphere of frustration and controversy. They are being forced into the streets by disgruntled chief executives and corporate mergers, and they are jumping to grab jobs that are new opportunities for them and bad memories for their predecessors.

The list of well-known top MIS executives on the move grew throughout 1988. Pillsbury Co.'a John Hammitt jumped to United Technologies Corp. and was replaced by Carl Wilson. The Travelers Co.'a Joseph Brophy took a job in the company'a employee benefits group and was replaced by Lawrence Bacon. John Hancock Mutual Life Insurance Co.'s Edward Boudreau was promoted to president of a company subsidiary. Sun Co.'a Dudley Cooke took early retirement when the company reorganized.

Other ranking MIS managers left the business for professions ranging from the ministry to podiatry. James Kubeck, president of Whiting, Ind.-based management consulting firm K4 Enterprises, estimates that the number of CIOs seeking his help in outplacement counseling doubled in 1988 over 1987.

Is the turnover madness abating? "No," say observers, "It will get even worse."

"The CIOs are asking, 'Who am I, and why am I going through this tremendous frustration and discombobulation professionally?' " Kubeck says.

"The phenomonon is partly due to the greater visibility of the position. The CIOs are more visible because they are closer to the top of the organization," notes Michael Simmons, a Bank of America executive vice-president.

Holding steady

Simmons himself is being tossed about in the turnover storm. He moved up a career ladder through mid-size financial institutions to Fidelity Investments subsidiary Fidelity Systems Co., where he took over the role of CIO in 1984.

But a disagreement with his company president — Simmons arguing that Fidelity should stay with a centralized strategy for the time being rather than move immediately toward decentralization — led to Simmons' resignation and eventual move to Bank of America.

Even at that bank there was CIO-level turmoil as Max Hopper ended a short tenure by returning to American Airlines and being replaced by former Seafirst Corp. executive Louis Mertes. Mertes then left the top Bank of America IS job in October 1987, due at least in part to the failure of a costly, long-term pension management system, which he inherited. Simmons then became Bank of America'a third CIO in three years.

Failing to meet expectations is one of the key causes of CIO turnover, says Zale Corp. Vice-President for MIS David Karney. Karney, who until Nov. 1 was the top computer executive at another Dallas-area retailer, Southland Corp., notes, "I've seen various statistics that say a senior data processing person in any major organization has a three- to five-year tenure on average. I guess I am fairly typical, if that is the case."

He changed jobs after five years at Southland because of the career challenges that a speciality retailer such as Zale offered.

"It's easy for a chief executive officer to think that someone can come in and make sweeping changes in the sys-

Connolly is *Computerworld's* senior editor, management.

tems organization, but if the mind-set of the company is not ready to change, the information executive can't really pull off the changes that have to be made," says Karney, who notes that CIOs may possess their own misunderstandings of what they can accomplish. He urges that CIOs exercise patience as they learn their business.

Many CIOs — such as The Travelers' Brophy — have worked 25 years or more in the same field and are seeking a change of environment, Simmons says.

He also notes that the top MIS post is stressful to start with and is made more so by arguments about corporate strategy, such as those relating to decentralization.

"Centralization vs. decentralization is purported to be the crux of the whole argument," Simmons explains. "But the point is that it doesn't matter whether you centralize or decentralize, as long as it works well for your own data processing organization and your own company. . . . They [CIOs, CEOs and users] are arguing about the chipped paint on the deck while the boat is sinking."

Bank of America's Simmons

Simmons advises that the two best ways for CIOs or CIOs-to-be to avoid becoming a turnover statistic are to learn as much as they can about their company's business and to stop talking in MIS dialects to their peers outside MIS.

Yet while the common advice to CIOs is to get more involved in general business management, one management consultant says a leading cause of turnover in the future will be CIOs who understand business but have drifted away from technology.

Bruce Rogow, executive vice-president for worldwide analytical resources at The Gartner Group, Inc., listed four causes for what he perceives as a doubling in the CIO turnover rate in 1988. The first three causes were similar to those cited by others in the industry:

- CIOs, whether good or bad at their job, being caught in a numbers game as the merger of two firms leaves one position.
- "Mediocre to good CIOs staying one step ahead of the posse" by jumping to new jobs before they can be fired.
- Senior management becoming dissatisfied with a CIO when even a capable CIO cannot adapt the IS strategy as the company changes rapidly.

Gartner Group's Rogow

Rogow's fourth cause sets him apart from other observers: "The one I think is going to create havoc in the next few years is that most CIOs are not prepared to deal with what is happening in technology. They have taken the 'T' out of IT — information technology. . . . You can't forget that you are still the chief technology officer."

He says too many CIOs focus on building strategic systems of the type made famous by American Airlines and American Hospital Supply Corp. while ignoring the need to recognize which technologies, which products and which vendors can fit together to help the CIO's company. Rogow cites as an example the rapid changes in database technology and notes that a CIO must understand the differences among varied offerings and how those new platforms differ from what MIS used for over a decade.

The man generally credited with originating the term "CIO," William Synnott, director of the Banking Division of the Nolan Norton Institute, says that turnover will continue. Synnott notes that the "old era" of DP was stable and that managers felt safe as long as they provided the needed services and contained costs by maintaining economies of scale. MIS is moving away from that backshop environment, Synnott says, and some managers are unprepared for the new world.

Unlike Rogow, Synnott expects more of the positions to be filled by general managers — executives who rose through the corporate ranks in non-MIS positions such as finance and marketing.

"When that occurs, a lot of MIS managers who were passed over feel usurped and start leaving," Synnott says, adding that other CIOs or potential CIOs quit when they see their empires diminished by decentralization.

The CIO who may become CEO is unlikely to be one who spent a career in MIS, he says. The former CIOs who became CEOs, such as John Reed of Citicorp and Robert Crandell of American Airlines parent AMR Corp., spent most of their careers in non-MIS positions.

Synnott, like many other consultants and CIOs, advises those climbing the IS ladder to step out of IS to get better business experience.

Nolan Norton's Synnott

Harold Cypress, western practice leader for information technology at Arthur D. Little, Inc. in Los Angeles, says that a general business background helps a CIO candidate understand where the company is heading.

"Most of the CIOs I know spend as much time worrying about how things are going to look in the future and what the business' needs will be in terms of systems support as they do worrying about day-to-day operations," he explains.

Cypress, who says the perceived increase in turnover might actually be attributed to the fact that some companies are creating CIO positions, cites two common mistakes in CIO hiring. First, CEOs tend to get a profile of the type of person they want based on what they read about successful CIOs in other companies. Second, CIOs, even when approaching retirement, neglect to groom successors with general management and IS experience.

He notes that most CIOs have five or six direct reports who focus on technology, rather than acting as general managers.

Another consultant who reports minimal CIO turnover in his area is Michael Anderson, regional director for management consulting at Groupe DMR, Inc. in Toronto. "In Canada, the turnover rate may not be as high as in the U.S. But there seem to be more and more people who are in the CIO role, no matter what it is called," he says.

Two career paths

Anderson suggests that one solution to the question of whether general business experience or technical expertise provides the power to move up the corporate ladder would be for a company to offer two career paths with comparable pay and prestige. One would be a technical route leading to a chief technology officer position, while the second would be more business-oriented.

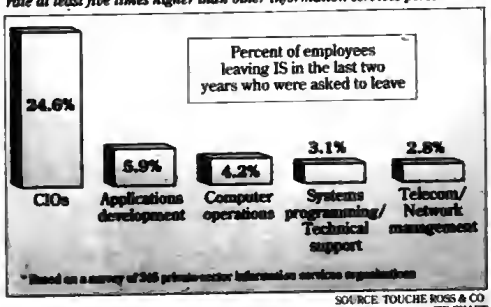
Will CIO turnover continue to grow? One of the researchers who worked on the Touche Ross study says yes, blaming the ongoing causes such as mergers and changing CEO expectations. But Thaine Lyman, a partner in Touche Ross' Chicago office, also offers one more factor.

"The free lunch — the big increases in budgets that IS has become used to every year — is gone. That, combined with the existing pressures on the CIO, indicate that the turnover may get worse," Lyman says.

But Lyman also sees a ray of hope for CIOs who become statistics in 1989. "You don't find the guys who are terminated out pounding the pavement for a long time. They always seem to find another job." •

Pink-slipped

*One-quarter of all CIOs departing from companies do so involuntarily, a rate at least five times higher than other information services personnel**



SOURCE: TOUCHE ROSS & CO
CW CHART

Computers shift our way of thinking

[illegible]
President
Bank One
Services Corp.

I think we can all point to numerous examples of the impact of computers on our work lives. The personal computer revolution has created new entire industries and enabled the distribution of both data and function into the hands of end users.

Technology has found its way into the fields of education, entertainment and, with intelligent workstations, even into the area of application development. The dreamer's children are finally getting new shoes.

More importantly, however, computers and computer-related technologies are changing the way we think, decision [illegible] and [illegible] of problems. [illegible] are [illegible] economic [illegible] [illegible] [illegible] users do not see the necessity of involving programmers to solve their information and reporting requirements.

Quickly and at an ever increasing speed, computers [illegible] how we are [illegible] business activities, product delivery [illegible] mechanisms.

These changes, while having a profound technical impact on our environment, are also presenting us with new social and moral issues. Expert systems, the design and database of which depend on input from knowledge engineers, pose no small threat in the eyes of those engineers as to the value of this knowledge and who owns and controls its use — sticky issues to be sure.

Information overload — too much data too quickly available — is a major by-product of the computer's influence in our workplace. We are being inundated with data that may or may not be useful to us in our decision-making processes. The management, interpretation and translation of this data into useful information has created a whole new role for knowledge workers.

Computers today control [illegible] [illegible] They [illegible] [illegible] [illegible]

INTERIOR

What's your mandate?

As MIS goals become more integrated with the business goals of the company, managers are paying closer attention to the trends governing their company's specific industry segment. *Computerworld* senior writer Alan J. Ryan interviewed MIS managers in a variety of industries to find out what their mandates will be for 1989 and how computing can affect the bottom line.

Esther Delurgio
Director of IS, Mitsubishi Motor Sales of America

"I'm striving to get the senior management team much more involved in the strategic planning of the use of information technology. The automobile industry is extremely competitive . . . and however we can use the computer as a weapon to succeed is the mandate. Part of the strategy is to get tools into the hands of every employee. Whatever we can do to help people do their jobs, whether the tool is equipment or access to the main host, we'll try to give it to them."

John A. Putney Jr.
Executive vice-president, Teachers Insurance and Annuity

"Our primary mandate is to develop and support some new products and services the company will be offering. Second, we will begin a major upgrade in our operating system software from VM/VSE to VM/XA and MVS/XA and eventually to MVS/ESA; it will be a multiyear project, but in 1989 we will make the most significant change. Third, we will define architectures that will allow the use of LANs and PCs in some of the major business units. We will also be upgrading the IBM 3090 we just installed."

Allan Ditchfield
Senior vice-president, MCI Communications

"For 1989, we will be focusing on quality, customer services and profitability. Our MIS group is unique because we're close to the company's business projects, such as the 800 and 900 services — those are company products, but they are really MIS responsibilities. Also, we're going to be opening up our back-end systems to let our customers use them as well. . . . We will let our customers come in and look at their own records in detail."

Tod O. Dixon
Vice-president, Northeast Utilities

"The biggest thing we're trying to accomplish in our industry is to constrain the cost of data processing. The other significant issue is measuring our contribution to the bottom line. Our focus is changing from doing everything for everybody to really managing our corporate use of DP and getting a good return for it.

"We're looking for a place to test out artificial intelligence concepts . . . and we're looking at building a marketing base that is very new to our business. We have a lot of equipment out there, and we're looking for innovative ways to use it to generate revenues."

Ron J. Ponder
Senior vice-president, Federal Express

"We're continuing to develop new software and information systems. We will also focus on developing global information systems. In the next two or three years, we're going to focus 100% of our attention on an international information system so that we will essentially have identical systems working in about 100 countries. The third aspect of our future emphasis will be on research and development for our channel devices [small personal computers that allow customers to do business with Federal Express online]."

E. Ritchie Fishburne
Director of IS, Burlington Industries

"Cost containment and cost reduction are the broad issues we will address in 1989. We will look at what is best for the company — centralized or decentralized mainframe processing. We've decentralized in the applications development area over the company's nine divisions. Other things that are the significant driving forces for us are customer service, quick response and electronic data interchange. We also want to expand our use of CAD in fabric design."

Lawrence Walters
Vice-president, Sara Lee Bakery Division

"The bottom line for us is providing a cost-effective accomplishment-oriented information resource function to directly support the company in meeting the goals of its approved annual operating plan. This goal will be achieved through the implementation of new major application systems, the technical upgrade of our computer facility and the addition of technical specialists in appropriate areas."

George Buick
Vice-president of IS, Highland Superstores

"We're bringing the company into the 1980s. Our company has been a little remiss in providing funding to information systems, and they've now recognized that MIS can provide them with a competitive advantage. Our mandate is to move the company off the old technology. Last year, we were basically on IBM System/38 technology. We recently installed minicomputers in each of our stores, and we're now linking them all to a mainframe. We're converting from the System/38 technology to mainframe technology." •

"Look, any DSU is going to work for you most of the time.
Most of the time?
That's like playing Russian Roulette with your data."

—Marylou Cincinelli, AT&T DSU Product Marketing Manager

"There are plenty of companies out there selling data service units that are almost as good as AT&T provides.

Almost as well built.

Almost as accurate.

Almost as reliable.

But, since when is 'almost' good enough for your company's data networking? AT&T DSUs are specifically designed to work in tandem with AT&T DATAPHONE® Digital Service for a level of

© 1988 AT&T ® Registered Trademark of AT&T

dependability unmatched in the business.

How does that make your life easier? You can control and collect diagnostic information from one central point, and with only one vendor providing your lines and equipment, service problems can be greatly minimized.

You can even have automatic trouble reporting through an AT&T Data Maintenance Operation and Control Center (Data MOCC) to help you monitor your entire system 24 hours a day.

That adds up to increased productivity for all your company's data operations. All because of having the right DSU.

Amazing, isn't it?"

For more information about AT&T DATAPHONE II DSUs, see your AT&T Account Executive, your authorized AT&T Reseller, or call 1 800 247-1212, ext. 719.

AT&T

The right choice.

With only one copy of Computerworld per department, security is extremely tight.

The more valuable a publication, the more important it is to have your own copy.

That's why you need your own subscription to COMPUTERWORLD.

Find out what you need to know.
When you need to know it.

You'll see what products breakthrough. And what products break down. You'll get the news and views of the industry. And the ads and advice of its leaders.

In fact, with COMPUTERWORLD on top of your desk, you'll be on top of your job.

And there's more...

In addition to your 51 issues of COMPUTERWORLD, you'll get — absolutely FREE...

Bonus issues of COMPUTERWORLD FOCUS — an in-depth exploration of a single critical topic: communications, data security, PC's, connectivity, and more. Not available on newsstands; these issues are sent to COMPUTERWORLD subscribers only.

Our special Spotlight section. Head-to-head product comparisons with an at-a-glance ratings chart. Security products, LANs, graphics workstations . . . a different product each time.

Order now. Use the postage paid subscription card bound into this issue . . . and stop waiting in line.

COMPUTERWORLD

375 Cochituate Road, Framingham, MA 01701

INTERIOR

KEVIN POPE

RISC: sweet music or just so much noise?

BY STAN KOLODZIEJ

Market will mature in '89, with some shake-out inevitable

The RISC market is filled with contradictions.

RISC vendors are priming the market pump, but some observers forecast a shake-out. Analysts see a consolidation along the lines of the carnage that laid waste the complex instruction set computing, or CISC, market years ago.

While vendors extol the increased processing power provided by reduced instruction set computing, MIS appears to be indifferent to such claims. If there is a risk for vendors with RISC, it is that MIS just won't care one way or the other.

As usual, the truth probably lies somewhere in between. RISC might not fire MIS interest in 1989, but it's certain to change the rules of the processor game.

For one thing, RISC will still represent an important entry point for new vendors, creating a new industry alongside a market polarized around the Motorola, Inc. 68000 and Intel Corp. 80386 and 80486 processor families.

The list of RISC players is already long and diverse, ranging from such small companies as LSI Logic Corp. and Cypress Semiconductor Corp. to heavy hitters like IBM and Digital Equipment Corp. And there are at least a dozen different RISC architectures already in the marketplace.

Even so, the RISC market is young and still undefined, enabling new RISC entrants in 1989 to gather some critical mass for their products.

Yet the RISC entry price will be getting steeper. RISC hardware is not likely to be much of a problem to develop, and in many ways it represents a commoditized product, following much of the processor market in general. The software part of RISC is something altogether different.

"The [RISC] software is tough for newcomers," explains Michael Mahon, a system architect at Hewlett-Packard Co. "There are things like software compilers, mapping, porting [Unix] kernels and a heck of a lot of software fine-tuning to handle. It's a deterrent."

A conflict of strategies

There are also signs that as the RISC market enters 1989, its freewheeling days will be left behind. The RISC market in fact is already closing ranks, coalescing around a set of very definite vendor strategies that could quickly pull smaller RISC companies into their orbits.

Right now, much of that pulling is being done by Sun Microsystems, Inc. and Motorola.

Sun is clear about its RISC strategy for 1989 and beyond: License as much of the development of its Scalable Processor Architecture (Sparc) as possible to other companies, including Cypress and Fujitsu, Ltd. and, more important, big guns such as Texas Instruments, Inc. By keeping licensing fees low, Sun hopes to attract more developers in 1989.

Farming such RISC development out, Sun aims to leverage the production of its Sparc processors and create a hotbed of market competition to improve on Sparc.

The end result, according to Dave Ditzel, Sun's manager of advanced CPU architecture, will be more powerful Sparc processors produced at lower costs. Eventually, Sun's endgame is to aim Sparc-based workstations at the heart of the mainstream PC desktop market.

"We want to do in the RISC market what the clone manufacturers did in the [IBM] PC market," explains Anthony West, director of international business development at Sun. "We want to break it open. What we lose in

Kolodziej is a *Computerworld Focus on Integration* senior editor.

MIS managers await RISC performance benefits

BY ROSEMARY HAMILTON

Look to nearly any computer vendor and you'll find a company that recently presented big plans for a RISC platform.

But look to nearly any MIS manager and you'll find someone who doesn't care much about the flurry of RISC activity.

Based on interviews with MIS executives, RISC is a technology that is not a part of mainstream computing today and will likely play a small role in corporate computing strategies in the early 1990s.

"It's not part of my long-term strategy, but it certainly has my attention," says Dennis Klinger, vice-president of MIS at Ryder Truck Rental, Inc. "I want to experiment with it, but other than that, we're just watching it."

Profitable RISC

Nonetheless, RISC is a selling tool for most vendors — from IBM and DEC to Sun and smaller companies like Mips Computer Systems.

"We see RISC as a huge buzzword, but users aren't going to buy a system just because it's a RISC," says Vicki Brown, director of systems research at International Data Corp. (IDC) in Framingham, Mass.

Analysts expect the RISC hype to continue next year as more products become commercially available and the different RISC camps challenge each other for market dominance.

RISC is being touted by some as the salvation for computing because it is expected to pick up where traditional CISC processors are expected to leave off. As CISC processors reach the physical limits of how much can actually be loaded onto a single processor, RISC processors are expected to take systems to new levels of performance.

"RISC technology is really the promised land," says David Burdick, an analyst at Dataquest, Inc. "We've just about run into a wall with CISC processing. If you talk to Sun, they believe they'll go up to 80 MIPS [with Sun's Sparc chip] before the decade is over. I believe that."

RISC relies on fewer instructions than CISC processors. While a CISC processor can run up to the 500-instructions range, RISC processors are normally less than 200, Burdick says. With fewer instructions, processors can be dedicated to specific jobs, and the smaller amount of instructions can be executed more quickly. The simple design also lends itself to a multiprocessor or parallel processor architecture more than the conventional CISC architecture does, Burdick says.

It is through this multiple-processor option that RISC-based systems will achieve MIPS ratings that surpass current high-end mainframes.

"Traditional architectures are reaching a dead end in terms of getting more performance," IDC's Brown says. "RISC will offer a lot more scalability, and that's important."

Not only will they bring performance improvements, RISC-based systems will be offered at lower prices than comparable CISC-based systems, analysts say. Since manufacturers will be able to build systems with simpler designs, their costs will be lower; they, in turn, can pass those savings on to users.

But there is a trade-off. With the price/performance benefits come a new platform, and that means existing software can't simply be ported to it. "No question about it," Burdick says. "The problem [for RISC] with mainframe users is all their software."

Despite the promises of RISC and because of the drawbacks, analysts say they do not expect MIS managers to rally around the RISC cause. Managers are more concerned with the overall price and performance a system offers than with the chip on which it is built.

"We don't sit around and talk about RISC," says Dean Allen, corporate vice-president of information and adminstrative services at Lockheed Corp. "We have a job to do. To the extent that it offers better cost and performance, we'll pursue it. But we're not putting a big RISC strategy in place."

Other users express a similar view, saying they expect vendors to provide a total package and that a vendor's talk about RISC doesn't affect them.

"We don't buy boxes anymore," says Patricia Stadel, administrative vice-president and director of information technology at Addison Wesley, Inc., a publishing company in Reading, Mass. "Frankly, I couldn't care less if they do it with a complex or reduced instruction set."

Both users and analysts expect RISC to eventually emerge in mainstream computing as a component of an overall architecture. Certain processor jobs could be best served by RISC; others most continue with a traditional CISC approach.

RISC will play its most critical role for applications in which raw computing performance is the top priority and jobs — such as repetitive mathematical calculations — in which the actual number of in-

Hamilton is *Computerworld's* senior editor, systems.

We have ways of

© 1988 Hewlett-Packard TS16901

We call it HP AdvanceNet. An open, highly efficient networking solution for multi-vendor environments.

"A few years ago, Hewlett-Packard made what must have been a difficult decision: It bit the bullet, gave up its proprietary networking products, and embraced industry standards long before most vendors even knew what commitment to industry standards implied. We have nothing but admiration for HP's commitment to OSI and multi-vendor interconnectivity."
—The Yankee Group

This "connectability" provides you with one very important benefit. Vendor independence. The ability to connect to equipment you presently own, as well as to equipment you'll be buying in the future.

In addition to standard networking capabilities, HP AdvanceNet offers many functions not available from IBM and DEC. Functions such as StarLAN 1 and 10, a cost effective link for small companies

structions required is limited. As a result, analysts expect to see RISC-based systems do particularly well in engineering environments.

"RISC will become especially beneficial in the workstation area, where users are not managing mulitple operations," says John Logan, president of the Aberdeen Group, a market research firm in Boston.

But the raw computing performance won't win many MIS managers' hearts, Dataquest's Burdick says: "To a general-purpose MIS environment, performance means supporting users adequately."

At CSX Technology, the information systems arm of CSX Corp., RISC has been pegged for a small niche in the overall computing strategy, according to Jack Cooper, president of CSX Technology.

"It's exciting, but it's for a selective niche for us, like a high-performance [application such as] process control," says Cooper, who oversees an installation of several IBM 3090s that service his transportation firm. "We see it as an engineering/scientific technology. We don't see it as mainstream."

Performance more important

The Market Decision Systems group at Shearson Lehman Hutton in New York recently installed a Sun-4 system, a RISC-based workstation that is said to process at rates of up to 10 MIPS. But according to Gary Handler, vice-president of Market Decision Systems, the Sun system was selected because of its performance, not because of RISC technology.

"I haven't made up my mind about what is better," Handler says. "I went with Sun because of performance. I wanted a demon compiler. It wasn't a conscious decision between RISC and CISC. I don't care if it's a CISC or RISC or whatever, as long as they can bring me 10 MIPS in a box."

Malcolm MacKinnon, a senior vice-president at the Prudential Life Insurance Company of America who heads up the company's MIS effort, says he views RISC as an issue for manufacturers, not users.

"My focus is for faster, better and cheaper," MacKinnon says. "We're concerned with how programs can run on a platform, not about how it's built." •

making them talk.

or departments using PCs. And OpenView, a network management system which easily incorporates multiple vendors' networking products into a Windowing function.

All of which puts HP in the right position to help make your company more competitive. Not only with the links to make your entire computer system, from mainframes to desktop PCs function as one, but with the support and service to keep it functioning.

In fact, HP will shoulder responsibility for planning, operating and troubleshooting your entire multi-vendor network, even the components which aren't ours.

For more information on HP AdvanceNet, call 1-800-752-0900, Ext. 282F.

HEWLETT PACKARD

Focusing on standards, openness

Scott McNealy
President and CEO
Sun Microsystems, Inc.

One of the most significant trends, one that will enable computers to proliferate the way automobiles did 70 years ago, is the move toward standards and true open systems.

The proprietary architectures and operating systems some companies are still promoting (and often protecting through threatened legal action) are not the right solution, since they limit the user's ability to choose. Imagine what would have happened to the auto industry if each model of car had the brake, accelerator and steering wheel in a different location.

Increasing standardization will make the computer an even more essential tool in the workplace, letting us further boost productivity and rapidly exchange information.

But these goals demand an even greater commitment to networks and distributed computing. One result of networking — electronic mail — could have an enormous impact on the workplace in the near future, as more people are brought closer together via computers.

Sophisticated computers and connectivity could bring about fundamental shifts such as working at home or all-electronic purchasing. Meanwhile, as computers and telephones become more closely linked, the computer could not become only a work center but also a communication center.

Computers will continue to take over time-intensive, often tedious tasks such as inventory and scheduling, leaving individuals more time for creative work.

However, powerful computers running artificial intelligence applications can be used for more demanding jobs.

Computer technology will continue to refashion the way we work at an accelerated pace. In time, a computer — like an automobile — will become such an integral part of our lives that we can't imagine working without it. •

licensing royalties we will more than make up through Sparc's market presence."

Sun sees the existing workstation market as three-tiered, with Sun sitting comfortably at the low and high ends and Motorola dominating the middle. West says Sun temporarily left much of the middle ground to Motorola's entrenched 68000 series processors.

The plan, however, is to put Motorola in a vice, squeezing that firm from the top with Sparc-based workstations and from the bottom with Sun's 386I workstations, which are based on 80386s, revised to run both MS-DOS and Unix. The 386Is, West declares, will only get more powerful.

Different drum

Motorola's RISC strategy for 1989 marches to a different drummer. Motorola plans to first create software critical mass behind its 88000 RISC processors. The more software available for the 88000, Motorola reasons, the more systems integrators will support the 88000 and find willing users.

Motorola's big vehicle to accomplish this is 88open, a consortium of software and hardware vendors supporting Motorola's Binary Compatibility Standard. BCS is a set of specifications that enjoins all software written for systems built around the 88000 to use a common interface to executable or binary programs.

BCS gets to the guts of software compatibility across hardware platforms and runs deeper than source code compatibility. The end result is that a program following BCS specs and written for one particular 88000-based system is virtually assured to run on another 88000 system.

That will be a big plus, eliminating today's tedious necessity of recompiling programs to run on various different RISC processors. With BCS conformity, programs would theoretically bridge the various Unix versions in the market now and could even apply to non-Unix operating systems as well. Traditional CISC processors never had such software portability.

As software goes, most observers agree, so goes the RISC market. "There is no such thing as a RISC market," says David L. House, Intel's senior vice-president of microcomponents. "It's a Unix market."

Motorola's BCS is actually riding on the back of AT&T's binary effort. BCS is itself a subset of AT&T's proposed Application Binary Interface (ABI), which is part of AT&T's long-awaited Unix System V, Release 4, set for introduction in late 1989.

ABI has been available to developers for some time. Both Motorola and AT&T stress mutual agreements whereby AT&T will use BCS as the basis for an 88000 ABI and 88open will try to extend BCS to full ABI compliance.

The impact of ABI on the Unix/RISC world will be significant.

"I don't think people realize how important ABI is," claims Don Anderson, vice-president of the Advanced Systems Department at Toshiba America, Inc.'s OEM Division.

"ABI is going to give systems vendors shrink-wrapped Unix programs that run across processors," Anderson maintains. "That's just what the Unix market needs."

Motorola's efforts with BCS are putting some fright into Sun, which is planning to bring Sparc licensees together in 1989 in an effort to stabilize Sparc work around certain agreed-on architecture specs. Part of that work will involve binary compatibility across Sparc processor lines.

According to Sun's Ditzel, "As competition in the Sparc arena drives prices down, we will also develop large Sparc software bases. That's essential."

And Mips Computer Systems, Inc., a Sunnyvale, Calif., RISC company that was recently courted by DEC, will use its Synthesis Software Solutions spinoff to help convert software from a number of companies, such as Relational Technology, Inc. and Unify, to Mips Computer processors. With the substantial presence of DEC supporting the company, software support for Mips Computer processors could surge in 1989.

Motorola and Sun are running hard, and for good reason. Intel is supposed to start prowling the market with its own family of RISC processors in 1989.

To confuse the competition, Intel has a number of internal code names for its RISC project, of which Race and the more prosaic N10 are only two. Whatever the name, Intel's RISC processors stand a good chance of being packaged and sold by Intel in various system configurations right from the start, targeting these RISC systems for specific applications — something Intel has been doing more of recently with its 80386 line.

The initial push for RISC to enter the mainstream commercial market will be as competitive replacements for high-end PCs, especially as networked workstations and powerful file servers — the latter usurping a traditional role of minicomputers.

Don't hold your breath, however. Despite the prediction of Sun that RISC will rapidly enter mainstream commercial computing, chances are the markets RISC will strike at in 1989 will not vary greatly from the traditional RISC bastions of the scientific/engineering and computer-aided design and engineering fields.

Though Fred Rehhausser, Motorola's VME product planning manager at its Microsystems Austin Design Center in Texas, says 1989 will represent explosive growth for the RISC market, Rehhausser adds that his company is also under no illusions as to where the bulk of that RISC revenue will be derived for some time to come.

"RISC will be used in the engineering and scientific communities, and especially in real-time embedded control applications where software compatibility is not such an issue," Rehhausser explains. "But we do see some niche applications in commercial computing, such as AI. That is where support from relational database vendors becomes important."

Intel's House agrees.

"RISC is being overpositioned," he says. "RISC will be immensely important in embedded applications, but we don't see it taken that seriously in the commercial marketplace. This year [1989] will begin to see a repositioning of RISC."

If it happens, HP hopes the repositioning isn't that severe. The company, after all, just introduced its HP-PA, a new line of minis based on its RISC Precision Architecture, and the HP-PA is aimed right at commercial computing applications.

"The cost of ownership of RISC machines is too attractive now to ignore in commercial applications," maintains HP's Mahon, who adds that 1989 will be the year RISC computers make a splash as network file servers, or at least that HP machines do.

The more the merrier?

There could be other potential RISC vendors to watch for in 1989. Apple Computer, Inc. is said to be seriously eyeing the market, and DEC is expected to introduce its own RISC machine based on Mips Computer technology sometime in the new year, amid speculation that the Maynard, Mass.-based giant might also have quite a time trying to make the new RISC machines binary-compatible with its existing proprietary VAX processor line.

Where would a market be without IBM? The Armonk behemoth is definitely a RISC vendor to watch in 1989. Although on the surface IBM's RISC strategy might not seem as clear as some of its competitors', don't be deceived.

Until recently, IBM's RISC work seemed to be on the fast track to nowhere. IBM's RT workstation line was faltering, though some recently upgraded models are being more warmly received.

A good part of how IBM is destined to get its RISC up to speed, however, is through its affiliation with the Open Software Foundation (OSF), a consortium of vendors opposing what they see as AT&T's Unix stranglehold.

IBM somehow convinced other OSF heavyweights to use IBM's AIX Unix derivative as a base on which to build a new Unix software infrastructure.

Since AIX was optimized for IBM's RTs, the OSF agreement can only breathe new life into future RT sales. And given the tight link between Unix and RISC, the OSF will make IBM a RISC player to contend with.

Ironically, IBM, which prides itself on its technical and marketing acumen, could in the end wind up getting much greater RISC mileage through the likes of OSF power brokering than it could through technical and marketing skills alone.

(For similar reasons, 1989 could be a good year to keep an eye on a company like Apollo Computer, Inc., which is busy creating a software political infrastructure that resulted in IBM's agreement to include key parts of Apollo's Network Computing System software specs in AIX.

Such a compact could boost Apollo's sagging sales for its Prism RISC-based workstation line and make the company a factor in RISC software. For these reasons and others, 1989 could prove to be the year that software politicking becomes a definitive art form.)

Shake-out?

Most observers say don't look for dramatic changes in the RISC market in 1989, but they also don't discount the possibility of a shake-out looming just beyond.

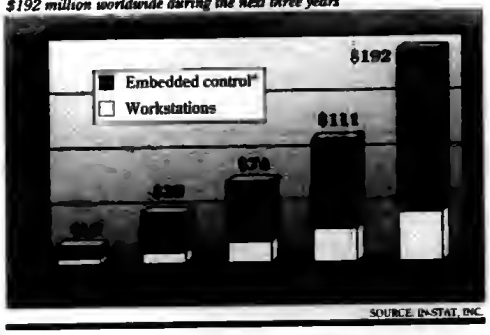
If new vendors enter the RISC market and if MIS stays cool to RISC, there could be trouble in what some call an already crowded RISC field. When too many processors chase too small a market, shake-out is inevitable, says Andreas Schreyer, Motorola's RISC line manager.

"A decade ago there were about 10 different CISC architectures vying in the market," Schreyer says. "Soon there were only Intel and Motorola.

"There are now about a dozen RISC architectures; to me, that says the writing's on the wall." •

RISC's user appeal

The reduced instruction set computing market is expected to grow to $192 million worldwide during the next three years



SOURCE: IN-STAT, INC.

A contender

Although CISC is expected to remain the dominant 32-bit architecture, RISC should gain an additional 15% market share by 1992

SOURCE: DATAQUEST, INC. CW CHART

> "THERE IS no such thing as a RISC market. It's a Unix market."
>
> DAVID L. HOUSE
> INTEL

The net manager's apprentice

Or, how a nostalgia nap turned into a network nightmare

BY JEAN S. BOZMAN

All right, so I couldn't resist. I admit that I took my two kids to a rerun of Walt Disney's *Fantasia* for reasons of nostalgia. When I was a kid, Mickey Mouse was the best character going. In *Fantasia*, which I've seen a dozen times since, Mickey got to play the Sorcerer's Apprentice. That was the fellow in the robe and sorcerer's hat who summoned his master's magical spell to get his housework done by legions of brooms.

Well, I, too, had been swamped with housework that weekend, and I guess I must have dozed off during the Sorcerer's Apprentice part. Soon I was having my own nightmare — but this was about telecom standards, not brooms. Here's how it went:

In my dream, I was the telecommunications apprentice of a master network manager. I worked at a corporate office in the northern Chicago suburbs, having recently been transferred from computer ops. Anyway, it didn't take long until my boss was called out of town for an emergency conference of the CCITT X.700,000 committee in Geneva or Brussels or somewhere. It seems the international standards folks had to decide on a few things before the end of the year.

As he threw on his coat, the old man shouted some instructions over his shoulder. It sounded like, "Don't worry, be happy," but I later found out it was "When in doubt, use TCP/IP." Good advice for a mixed-vendor network.

Bozman is *Computerworld's* West Coast bureau chief.

Well, the boss was probably winging his way over the Atlantic when I got my first call on the Help desk. Seems like one of our Chicago end users wanted to access a European database but didn't know how to use the CCITT's X.75 internet standard. "No problem," I said and rushed over to the stack of communications manuals gathering dust on the old man's file cabinet.

Turning the dog-eared pages of one of the manuals, I discovered something I had always suspected. These standards had multiplied like bunnies. All the familiar CCITT X. standards were there, along with the well-known IEEE series. There were others, too — ones I'd never even heard about.

Communications standards were not the only ones that had proliferated. A second manual, this one on software, outlined the differences between AT&T's Unix System V, Xenix and IBM's AIX.

While I was thumbing through the manuals, I happened on a pink-colored cheat sheet in the master's own shorthand that summarized the differences between the standards. "Wow," I thought to myself, "Even he can't keep them straight."

Fortunately, my caller soon abandoned his quest for the data stranded in that far-flung European database. Seems my Chicago end user couldn't get his log-in sequence straight, anyway. Relieved that my first close call was over, I got some coffee at the Help desk's coffee station.

Then I returned to the network manager's cheat sheet, which amounted to a list of macros that sorted out kinks in our firm's global network.

Just as I was memorizing my first macros, the Help-line phone rang again. By this time, it was late evening, and Tokyo had just come on-line. Seems the Japanese office wanted to know how to transfer a Unix file to my boss' MS-DOS-based PC. "No problem," I said. "Just tell me which version of Unix you're using, and I'll call up a specialist."

It would, indeed, take a specialist to understand all the variations of Unix on the market today. So I called up my Uncle Don, who had worked at Bell Labs before Unix was born, and he told me a little bedtime story: "Once upon a time, Bell Laboratories gave birth to a new operating system called Unix. I've heard his daddy was AT&T and his mother was a PDP-3 minicomputer.

"In his early years, Unix was the favorite plaything of the scientific community," Uncle Don continued. "But when he was older, Unix got a California cousin, a rival called the University of California at Berkeley Unix 4.1.

"Strange thing, though," Uncle Don said. "When Berkeley 4.1 grew up, they started calling him 4.2 and 4.3 — and I hear he doesn't look a thing like Unix System V. But I did hear that Berkeley's father, Bill Joy, is trying to conduct a genetic engineering experiment — something about merging the best traits of Berkeley 4.3 and AT&T's Unix System V. Kind of a test-tube baby."

Get to the point

"What's the point of this story, Uncle Don?" I asked, as I was under a good deal of deadline pressure. "Well," Uncle Don said, "some people didn't like Unix's father at all. That would be AT&T, who lives in New Jersey. Then, in 1988, another family wanted to adopt Unix. They called themselves the OSF — but what that stands for, I don't know. Right now, they're preparing a nursery for the new Unix offspring, but they won't show anybody the wallpaper or the carpet — and they won't grant Daddy AT&T any visiting rights."

"But what can I do to help my Tokyo end user right here and now?" I asked. "Tell him it's morning in Japan," Uncle Don advised. "Your Japanese user should go out to the local computer store and buy a version of Unix your Chicago PC can accept. He's going to have enough trouble sending the darned files halfway around the world. Thanks for the call, but I've got to turn in myself." That was Uncle Don's way of signing off.

After my bedtime story, I realized with no little horror that everyone else had gone home. "Please call back later," I told the Japanese caller. Anyway, with all those foreign standards to learn, I wasn't ready to learn about Kanji characters, too.

OK, OK. Things had gotten a bit crazy, but I was still in one piece. The machines were humming. The Help desk phones weren't lit up. That's when I saw it — MY FIRST BIG PROBLEM. The oversized IBM Netview screen was display-

BEATA SZPURA

ing a Systems Network Architecture system alert I'd never seen before. "Oh no!" I said, "I wonder if it'll go away by itself."

What I didn't know, or couldn't have known, is that Netview was better prepared for the task of network management than I was. It already knew which things to worry about and which ones not to worry about. But it was also patiently trying to tell me that a major link had gone down in Texas somewhere.

Seems a tornado had ripped through central Texas, around Austin. That's when the Help desk hot line started doing its impersonation of a Christmas tree. And that's precisely when I could have used Mickey Mouse's secret formula to multiply my hands or fingers to handle all those phones. Mickey's formula seemed to work well enough on brooms.

WHAT I DIDN'T know, or couldn't have known, is that Netview was better prepared for the task of network management than I was.

"Network hot line. Can I help you?" I forced myself to say. "Hey, who is this, anyway?" the caller demanded. "We're in Austin, and we've got to hook up to Waco's VAX. That darned tornado has ripped the roof off our office, but the show has to go on. Our accountants say so. What's worse, our IBM mainframe doesn't even have a DEC-SNA interconnect package!"

For a fleeting moment, I heeded my network master's last-minute advice. "Why don't you try using TCP/IP?" I ventured. But the howl from the wind that was plastering computer printouts against the Texas data processing shop's walls drowned out my weak suggestion.

Well, that Waco plant was one of our biggest factories, and without orders from the corporate IBM mainframe, the entire operation might be forced to close down. Just then, I remembered my boss' cheat sheet and cooked up a log-in sequence that probably had never been tried before.

It's no surprise that it didn't work. Instead of connecting the two Texas sites, I'd inadvertently gotten the Texas users logged onto that Japanese mainframe. Boy, was I going to be in trouble when the old man got back from Europe. That's when I tried patching the two Texas circuits together by hand. Not only didn't this work, but I shorted out the modem rack so badly that sparks started flying everywhere. I hoped the flashes wouldn't land on some errant piece of dust behind the rack and start a fire.

In the nick of time

Just then, the door flew open. I didn't know it yet, but help had arrived. I dove under a swivel chair to stay out of sight. It was 7 a.m., but the new day wasn't getting off to a good start. What began as calls from the stricken Texans had mushroomed into angry calls from coast to coast. New Netview messages were coming on the screen, fast and furious.

To my great relief, in walked the old man. Seems his plane never took off from snowed-in O'Hare. He had spent the entire night trading networking tricks-of-the-trade at O'Hare's Skyline Bar with a French communications specialist from IBM's LeGaude Lab. The former member of the French Resistance got a big charge out of the international standards movement, it seems, because it was really a nice way to fatten up his research and development budget. He's still working on making SNA conform to the Open Systems Interconnect.

The old man surveyed the damage, glancing from the smoking 19-in. racks in the back to the blinking red lights on the Help desk phones.

"Go back to computer ops, where you came from!" he growled. "And give me back my cheat sheet." With that, he got on the phone with Japan, read them a few lines of code and hung up. Another problem solved by the network master.

I guess I'll never really know what I did wrong or right that night in the network center. All I know is, I'm glad I'm not a network manager anymore. I'm especially glad I didn't have to memorise all those standards. And mostly, I'm glad that the stirring music of *Fantasia* jarred me out of my dreams and landed me back in a Chicago movie theater — where I belonged. To borrow from another great flick, "There's no place like home. There's no place like home. There's no place . . ." •

PROVEN PERFORMANCE. PROVEN RELIABILITY. PROVEN TECHNOLOGY.

PROVEN POSITIVELY.

digital review TARGET AWARDS WINNER

Award-winning Design

It's no surprise that System Industries SI93 C-Series disk drive was the overwhelming choice of thousands of *Digital Review* readers who compared the quality, performance and reliability of half a dozen products in the disk storage category.

100% DSA Compatible

Compare it for yourself and you'll see that our award-winning SI93C is smaller. More powerful. More reliable. And much less expensive than comparable capacity drives.

This high speed Winchester drive offers 50,000 hours MTBF, 15ms average seek time and 23ms average access time. And it's 100% compatible with all DEC DSA controllers.

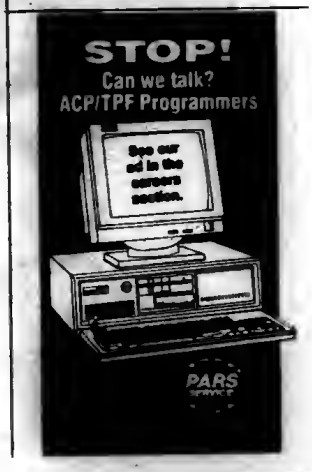
Special Offer

When you buy a subsystem with four SI93C disk drives by March 15, you'll get a priority delivery position on any of our HSC-compatible tape products, plus a 10% discount on the tape. Delivery on the HSC tape products must be taken by July 22, 1989.

For more information on System Industries SI93C and our complete line of integrated storage subsystems, write or call us toll free for the number of the System Industries Sales Office nearest you, and remember to ask your System Industries sales representative about our other disk and tape special offers.

1-800-333-2220

System Industries
560 Cottonwood Drive
Milpitas, CA 95035



LANDSCAPE

Fast speeds, slow expectations

PCs may be promising more power, but users aren't that interested anymore

BY WILLIAM BRANDEL

If the adage is true that anything worth doing is worth overdoing, the personal computer market has found its motto. Now the market's task at hand is to rediscover its mission.

The PC market appears to be cooling after a long period of rapid growth. Technological developments and manufacturing advances are allowing vendors to push the PC performance envelope. But now the question that MIS asks is, How much PC is too much?

Like the auto industry, the PC business is driven by consumer and business technology. PC makers can benefit from something the automakers learned the hard way about power hunger. As Detroit ground out luxurious gas-guzzlers that were rivaling artillery tanks in size, the possibility of an oil crisis that would bring U.S. auto manufacturers to their knees was as remote as the possibility of a memory chip shortage wreaking havoc in the PC market in 1988.

Brandel is a *Computerworld* senior writer.

The oil crisis forced the auto companies to downsize their designs and their expectations. Are PCs heading down a similar highway as Detroit?

Currently, powerful Intel Corp. 80386 processors are hitting the market, and the more powerful 80486 is just around the corner. Meanwhile, MIS is still figuring out how to get the most out of the adequate 80286 machines.

"There's not enough need for the amount of PC we're presently using," says Don Whittington, MIS director of the Michigan Sugar Co., based in Saginaw, Mich.

But Whittington notes that his company is using PCs based on the Intel 8088 processor — not a high-powered processor by anyone's standards.

"Our people are just using them for word processing and spreadsheets, and they can only do so much of that," he says.

Michigan Sugar is an example of what is occurring in many businesses. As it is the norm to automate in business today, it is also the norm to upgrade. But because of long-range budgeting and expected PC advances, many companies own more PC power than they need. And while underutilizing their PCs, employees also waste time trying to figure them out rather than doing their jobs. But as the out-of-control market is now being tamed by corporate budget restraints, MIS is facing different PC decisions.

"Days of rampant buying are over," says Bruce Stephen, a PC analyst at International Data Corp. (IDC), a Framingham, Mass.-based market research firm. As a result, "Companies are becoming much more conservative with how they use PCs.

"PC products will not repeat the success of the *E.T.* video," Stephen says, alluding to the videotape sales blitz that occurred as soon as the popular movie was released into the home entertainment market.

"The PC market has been saturated with technology since the PC was first introduced. MIS budgets are tightening, not getting larger, and PC managers are being very careful about how they implement, study, gather evidence and make sure products are deliverable before they commit to any type of buying."

Stephen's analysis reinforces what other analysts and MIS officials believe is a new phase of PC organization. Managers are reassessing the PC's role in their businesses.

"Forthcoming PC technology will be both good and bad," says Richard Kulper, MIS director at Sulzer Bingham Pump, Inc., based in Portland, Ore. "But if not planned properly, the PCs will come back to cause problems. And the hardware strategy cannot be controlled without spending a lot of money on [employees'] software."

Controlling the PC environment for a business includes estimating the amount of power required to perform the tasks that users need. With the new age of PC computing comes new budgeting priorities. Some companies are centralizing purchases and basing them on brand names; other companies purchase every product upgrade. Often, the needs of the users are overlooked.

One MIS manager notes that most of the PCs in her company are not utilizing the resident hardware and software. "Corporate wants us to use Dbase IV and asked me if I needed it or not," says Melissa Broadway, a data processing coordinator at Lomas & Nettleton Financial Corp. in Dallas, Texas. "I think we should look at Dbase III Plus and see if that is being used to its full capacity yet. We were just getting to use III to its full capacity when it was upgraded."

BILL RUSSELL

Catch-22

MIS and industry analysts concur that upgrading is overrated. In most cases, they say, productivity is not increased but depleted, and a catch-22 between "more productive" software and "higher performance" hardware begins.

For example, Michigan Sugar's Whittington notes that when a higher performance PC is brought into the office, the end results have worked against the stated intent: to make the employee more productive and useful to the company.

"Some people start playing with their PCs, trying to get them to do more for them, and they are usually the ones who be-

come less productive," he says. "Most of the things that our people are using PCs for can be done faster by hand," Whittington adds.

The issue comes back to where it started. Is the PC the means or the end? The emphasis, MIS directors say, should once again be on end users and what they are trying to accomplish with their PCs and making it easier, not more complex, to use the machines.

> "MORE AND MORE, our users are becoming familiar with the term 'vaporware.' We were interested in OS/2, but the [users'] enthusiasm dwindled after it came out. . . . So we turn back to the XTs and ATs instead."
>
> MELISSA BROADWAY
> LOMAS & NETTLETON FINANCIAL

Familiarity breeds contentment

So back at square one, MIS calls on an old friend. Many managers say they believe that the strongest feature that drives PCs is user familiarity with the operating system — DOS, in most cases.

"Why switch to OS/2 if you are comfortable with DOS?" asks David Carnevale, vice-president of microsystems research at Infocorp, a Cupertino, Calif.-based market research group. Carnevale's group analyzes PC user trends. "It is basically against human behavior to change when you are comfortable with an operating system unless something comes out that is important enough [to warrant a change]," he explains.

MIS managers maintain that they are hard-pressed to find something brilliant that is new in the PC market — or anything new enough that would move people to change their work habits. Under this logic, users do not have much cause to switch to OS/2.

The major impediment to OS/2 is simple: There is no demand for it. Not many applications are available that can run on it, and users say they do not want to switch from DOS.

OS/2 is difficult to use without the Presentation Manager, a graphical user interface co-developed by IBM and Microsoft Corp. The complete system is also expensive to use: Carnevale expects a fully loaded OS/2-running machine to start at around $14,000, about $12,000 more than it costs for a basic IBM compatible running DOS.

Analysts and MIS managers are scaling back their views of the demand for OS/2. Figures from Dataquest, Inc., a market research firm in San Jose, Calif., indicate that despite the Presentation Manager's Oct. 31 introduction, affordable applications that are compatible with it will not be out until 1990. Both Dataquest and IDC do not expect user demand for OS/2 to exceed DOS until that year. DOS will continue to be strong into the 1990s, IDC's Nancy McSharry says.

Seemed like a good idea

So why OS/2? Analysts and MIS managers say that it seemed like a good idea before it arrived. But once in the office, it's a horse of a different color.

Because of human psychology, users look at IBM's Video Graphics Array and Enhanced Graphics Adapter screens, and suddenly Color Graphics Adapter screens look funny. You look at a laser-page printout and dot matrix does not look so good. Word processing performs better with a faster CPU.

Which brings the argument back to the machines that run this software. MIS Director Broadway explains her dilemma.

"We [were] looking at PS/2s, which I think are an interesting idea," she says. "But then there's software. More and more, our users are becoming familiar with the term 'vaporware.' We were interested in OS/2, but the enthusiasm dwindled after it came out. We were also at first excited about PS/2s, with all the memory advantages without being physically larger machines."

But Broadway says the excitement about the PS/2s waned when she discovered problems trying to connect the machines to the mainframe. "So we turn back to the XTs and ATs instead," she added. "How do you recover your loss?"

REALIA COBOL DRIVES THE HIGH-SPEED DESKTOP

Our competitors will tell you that performance is secondary—it's not. Or they'll want you to buy faster hardware—don't.

Thousands of programmers know how much difference Realia COBOL makes every day, in their own productivity and their users' satisfaction. Realia COBOL is not only the fastest-compiling COBOL for the PC or PS/2 (2 to 10 times faster than the other PC COBOLs). It also produces the tightest, fastest executable programs (4 to 70 times faster than the others).

Call for your copy of the Realia COBOL 3.00 Benchmark Report. Or ask for a free evaluation copy of the product—we'll also send you the benchmark program, so you can compare the compilers for yourself.

REALIA®

10 South Riverside Plaza, Chicago, IL 60606 • (312) 346-0642 • Telex 332979

Broadway says that if the PS/2s cannot be integrated into the mainframe environment, they become a "dead issue," or virtually useless for her integration purposes. "I guess I'll have to find somewhere in the company to put these PS/2s."

"The PC market will experience specialization, a segmentation by brand into different product applications," IDC's Stephen predicts. "With stand-alone desktops running on Intel 80386 processors, the market cannot really equate these products as standard personal computers."

Most analysts say they agree that these machines, currently based on the 80386 processor and soon to include the 80486, are a bit much to put on one individual's desktop.

MIS MUST consider that employees are using the PCs as tools, not to do their jobs for them.

Another factor that enters into the overall picture is the desktop cost structure. IBM Personal System/2 Model 70 and 80 machines can range anywhere between $6,000 and $10,000.

Stephen estimates that machines built around the Extended Industry Standard Architecture, an alternative bus built by IBM's Personal Computer rivals to compete against the Micro Channel Architecture (MCA), will start in price at the $12,000 to $15,000 range.

But currently, the majority of the million-plus MCA-based PS/2s at user sites are in stand-alone configurations. This means that most of these users are operating with, on average, $8,000 of hardware alone.

Considering that few software or hardware products are available to take advantage of the PS/2 architecture, it is a safe assumption that these machines are currently not being utilized to their full potential.

Common sense prevails

But even in the midst of some very confusing predicaments, there is a light in the darkness: common sense.

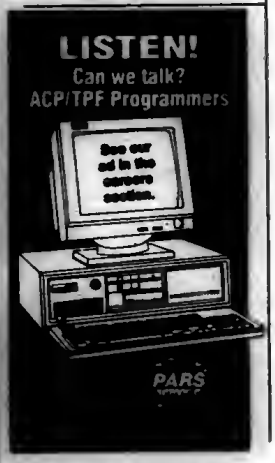
As companies try to be more competitive by using technology, MIS must consider that employees are using the PCs as tools, not to do their jobs for them.

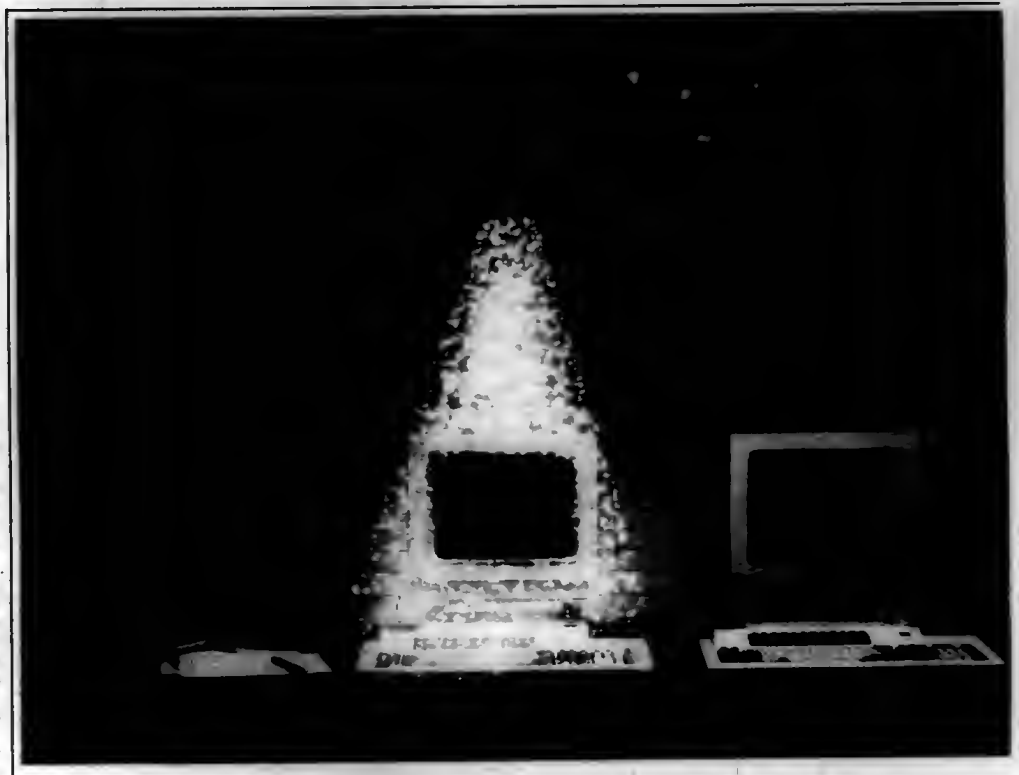
Common sense calls for MIS to deliver PCs that are appropriate for the users' tasks and to ensure that the machines can be integrated into the larger system. If the PC cannot be used to assist the employees' productivity, the purchase works against — not for — its business purpose. ●

Power drives

The rise and fall of Intel microprocessor-based PC types

SOURCE: INTERNATIONAL DATA CORP.





The Power of Automated Operations Is Here.

It takes power to automate. Not just iron and a little software. But a force behind the automation tool that can help when things get tough. Candle, the company that defined MVS performance with OMEGAMON,® has entered the automated operations field with AF/OPERATOR.™

Energize Just What You Need
Candle's family of automation products is flexible enough to meet your individual needs—from simple message management to remote operations. It's up and running in an hour, handling basic message traffic and doing flawless IPLs at warp speed.

Or Blast Off Into Full Automation
When you're ready to automate recovery or complex procedures, AF/OPERATOR enhances your growth. With an automated operations product from Candle, you're uniquely positioned to handle whatever you need in the engine room, including automated availability and performance when the time comes.

Streamline the Engine Room
Basic message management is the first step. And with AF/OPERATOR's sample library, that first step is a snap. Yet, your horizons are never limited because you have the power to tap into fully integrated automated operations with the ability to control MVS and its subsystems—IMS, DB2, CICS, and JES.

With High Performance
System overhead isn't an issue when you can have less than 1% CPU consumption. Nor is scheduling when you can make changes to the system on the fly, rather than waiting for an overnight 'gen.'

And Support From the Mother Ship
When you take a step into the dimension of automated operations, you want the best ground crew behind you. And Candle's support has received DataPro's highest rating. This support extends beyond round-the-clock customer service and education. Candle spends $30 million a year in R&D so you won't ever be left behind.

So whether you're going to the outer limits of automation or just streamlining the engine room, Candle is ready to join your crew. Let automated operations beam down into your data center. Call Terry Forbes today at (800) 843-3970.

Candle®

Copyright ©1988 Candle Corporation. All rights reserved.

PCs not yet part of CAD set

BY JULIE PITTA

Personal computers are slowly making inroads in engineering departments as tools for less demanding applications. However, Unix-based engineering workstations continue to be the machine of choice for serious design work.

"I think you can probably make any high-end PC into a workstation," says Alan E. Holley, principal consultant for engineering computing at Hughes Aircraft Co.'s Ground Systems Group, the largest of the six groups that make up Hughes. "But what machines are actually purchased tend to be based on what people have been used to using in the past."

Pitta is *Computerworld's* West Coast senior correspondent.

Hughes is using Sun Microsystems, Inc. workstations to perform computer-aided software design for state-of-the-art defense systems. PCs so far have been reserved for administrative tasks. As with many engineering departments, engineers at Hughes tend to use two types of machines — Suns for design work and a PC to run traditional applications such as spreadsheets, word processing and database management.

Jeff Ehrlich, MIS director of General Electric Co.'s Medical Services Group, buys every kind of PC imaginable for his users, from Tandy Corp.'s IBM Personal Computer compatible to Apple Computer, Inc.'s Macintosh II. However, the engineering group has not adopted the PCs brought in for its design work.

"Sun is very strong with the engineers," Ehrlich says. Not even the Mac II running A/UX, Apple's version of Unix, has persuaded GE's engineers to give the Mac II a try. This is despite Apple's efforts to promote the Motorola, Inc. 68020-based Mac II as an engineering workstation and the proliferation of Macs within GE, which is buying more Macs than anyone right now.

Ehrlich says the problem with the Apple approach is A/UX, which lacks the speed of the Sun operating system, its base of applications software and support for the X Window System environment.

Part of the resistance to PCs stems from elitist engineers who want the fastest, most powerful machines available. However, their bosses are recognizing the economy of a PC vs. a traditional engineering workstation. An entry-level engineering workstation from Sun — considered the leading vendor — or its nearest competitor, Apollo Computer, Inc., costs about $20,000.

An Intel Corp. 80386-based machine from Compaq Computer Corp., considered the leader in 386 technology, sells for about half that price. As a result, industry watchers say that more PCs are being purchased as engineering tools.

The 386 microprocessor allows PCs to offer a more powerful hardware platform for Unix. However, the 386 still lacks the speed of a 68020. While a 386 running Unix is not suitable for complex applications such as molecular modeling, it is suitable for two-dimensional design work.

PART OF THE resistance to PCs stems from elitist engineers who want the fastest, most powerful machines available.

"An 80386 running Unix is absolutely a workstation," insists Dave Burdick, a vice-president at Dataquest, Inc., a San Jose, Calif., market research firm. "If they can use the disk as a rotating memory device, then they can run large engineering programs. You don't need to spend $50,000 to do CAD," he says, referring to computer-aided design.

Burdick's colleague Bill Lempesis, a PC industry analyst at Dataquest, says more PCs bundled with Xenix, Microsoft Corp.'s version of Unix, are being sold than ever before.

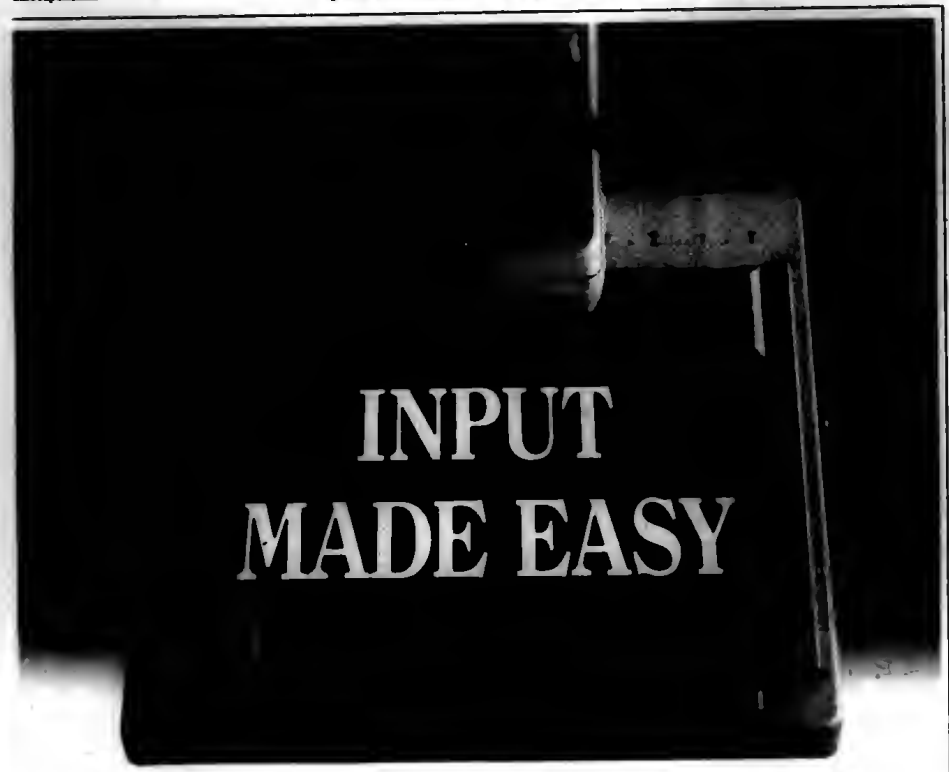
Not there yet

Both Burdick and Lempesis say 386s, like the Mac, have a long way to go before becoming popular with engineers. "The 386 running Unix is still an immature environment," Burdick says. "There isn't very much application software written." Lempesis adds, "PC vendors haven't positioned their machines as engineering workstations."

One 386 that has been positioned as an engineering workstation is the Sun 386i, introduced earlier this year. The 386i runs Microsoft MS-DOS and Unix. Sun has not released shipment figures on the new system.

In addition to prejudice, PC vendors must overcome some physical obstacles, Burdick says. Large corporations have years' worth of data stored in minicomputers and mainframes that must be accessed to perform engineering tasks. Workstations provide the better link to mainframe applications, Burdick maintains.

"The large companies are tied into their workstations," he says. "They've built up years of data that they aren't willing to give up. PCs just don't offer the kinds of connectivity and compatibility to these machines." ●

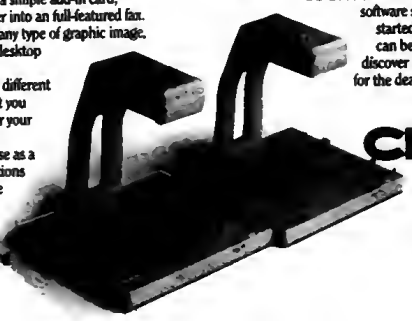


DS-2000 and 3000:
The Affordable Scanners From Chinon.

Chinon's affordable new scanners could change forever the way computers are used. With OCR software you can input text without retyping it. With a simple add-in card, DS-2000/3000 turns your computer into an full-featured fax. And with the ability to scan almost any type of graphic image, DS-2000 and 3000 are perfect for desktop publishing.

Our scanner models offer different levels of scanning resolution so that you can have the scanner that's right for your applications-and your budget. The affordable DS-2000 is perfect for use as a fax or for scanning line art-applications where its 200 dpi resolution is quite adequate, and where speed may be more important. DS-3000, with its 300 dpi resolution, is better suited to OCR applications, or for scanning images for desktop publishing that require grey scale and higher resolution.

DS-2000 and 3000 are sold bundled with exciting software so that it's easy for you to get started. Discover how your computer can be more useful than ever before—discover DS-2000/3000. Call TOLL-FREE for the dealer nearest you.



CHINON

Chinon America, Inc.
660 Maple Ave.
Torrance, CA 90503
Toll-free (800) 441-0222
In Calif. (213) 533-0274

LANDSCAPE

CASE fights to beat 'all talk, no action' image

Confused users hold unrealistic expectations of the technology's short-, long-term benefits

BY NELL MARGOLIS

CASE, at this point, is a lot like teenage sex," says an enterprising CASE consultant. "Everybody's talking about it; few are actually doing it; and even fewer are doing it right."

While some might argue with his analogy, few involved in the implementation of computer-aided software engineering (CASE) — whether marketing tools, consulting with would-be users or attempting to join the ranks of CASE users — would debate his point.

A study, among the first of its kind, conducted by Bellevue, Wash.-based consulting and market research firm CASE Research, surveyed commercial, mainframe-oriented MIS shops at large companies across a broad spectrum of industry sectors with regard to CASE implementation and intention. The relative dearth of active CASE work, coupled with a low level of what the report called "CASE preparedness," led the report to conclude that "the market as a whole is in a 'pre-CASE' environment."

CASE Research's findings were confirmed last month by *Computerworld* (see story page 50). What factors are retarding the implementation of one of the hottest technologies to flood media pages and market shelves in the past several years? And how likely are these barriers to be overcome in the coming year? The short answers appear to be "many obstacles" and "very likely — at least to some extent."

What is CASE, anyway?

One of the first (and worst) problems facing CASE, says CASE Research Chairman Vaughan Merlyn, is that the very attention the technology garners is confusing users, not only about which tools do what for whom, but also as to what CASE is, or is trying to be.

"There aren't very many people who can explain the promise of CASE tools in two or three sentences," admits Anthony I. Wasserman, chief executive officer of San Francisco-based tool vendor Interactive Development Environments (IDE). A major reason, he says, is that there is a plethora of alluring products, but there is no unifying or simplifying concept for the technology.

"There's a tremendous hype/reality gap," Merlyn says. This has two insidious effects. First, hype has inflated expectations, which lead to early frustration when individual CASE tools or approaches do not turn out to be overnight cures for whatever problem the user hoped to abate. Second, Merlyn explains, the hype deluge is leading users to aim CASE at the wrong problems.

"The hype is about productivity," he says, "but the real issue is quality. CASE teaches you how to do things better — not how to do the wrong things faster."

The result of this confusion is predictable. "Many firms," IDE's Wasserman says, "have taken a very short-term view of what's out there. They rush to get a tool to evaluate on a specific project without assessing how either the tool or the project relates to overall software development needs, methods and goals."

Education is the apparent cure for this problem, and, not surprisingly, explaining CASE is rapidly becoming a market in itself.

"When companies bring in CASE out of excitement without any organizational preparation, the tools don't fit into the corporate culture and usually become shelfware," says Dave Sharon, president of CASE Associates, a consulting firm based in West Linn, Ore. Consultants are taking advantage of a major income source by providing CASE services including auditing companies for CASE preparedness, Sharon says.

Self-education — becoming a canny consumer — is also a good idea, claims CASE consultant and newsletter editor Gene Forte. For instance, "Look for experienced vendors. Ask: Does this vendor have a users group? Who is invited to attend its meetings? What do they speak on?"

Also on the increase, according to many users and would-be users, is education at the peer level. "This user-group thing has really taken off," says Kurt Wagner, manager at Arthur Young in Seattle, upon returning from the first nationwide organizational meeting of the CASE User's Group, an association spearheaded by CASE Research. The seedling association started with one regional chapter when the conference began early last month; by the time the attendees departed, nine regional chapters were formed.

"There's tremendous interest in this," Wagner says. "Until now, there's been no monthly forum with a working-session feel to it, where CASE users could exchange information and experiences. Almost everything you read about CASE is put out by a vendor."

CASE of resistance

"CASE is a tremendously hard sell," says Judith Martin, vice-president of the First National Bank of Chicago. One of the major factors making it so, Martin explains, is the

KAREN TUCKER

Margolis is a *Computerworld* senior writer.

Pandora's box nature of CASE. "At every step, as you implement methodologies, new questions and problems appear — you need more understanding, more information, more management," she says.

For starters, Merlyn says, "Programmers feel threatened by CASE." They are ill-educated to feel otherwise, he states. "Throwing CASE at programmers is like saying to a nurse, hey, we've got this great computer-aided brain surgery software that we want you to start using tomorrow."

Adds Merlyn, "Just because you have the tools doesn't mean that you have the training that makes you able to use them." Even those who do not feel threatened are often unprepared to discipline themselves to the rigorous methodolgies that underly CASE.

"The mind-set of software developers is a major barrier to CASE," says Wayne Sanford, director of contract service systems development at Bath, Maine-based Bath Iron Works Corp.

Software developers, he says, often "don't take an engineering approach — which is what CASE relies on. They take an artsy-craftsy approach, where everyone has his favorite bag of tricks. Many aren't skilled in formal methodologies; they have to pick them up by osmosis."

Ironically, understanding does not always break down the resistance to CASE. To the contrary, as users realize the time commitment inherent in what amounts to a revolution in the way software creators think and plan, they often balk.

The full transition to working CASE, says Lee Stevens, a Corporate Engineering and Technology engineer at Pitney Bowes, Inc. in Norwalk, Conn., "isn't the two days that some would lead to to expect; it isn't the six months that some would imagine; it'a more like two years. The decision to go with CASE should be made with the recognition that it'a going to be around for a while."

Unfortunately, "IS organizations like to see a lot of value up front," says Woody Blaylock, marketing and sales manager at Owens-Corning Fiberglass Corp. in Toledo, Ohio. Performance Resources, Inc., a software design consulting firm in Falls Church, Va., recently surveyed 19 CASE user companies on the question "What must systems/DP organizations do to successfully implement CASE tools?"

According to the ensuing research report, survey participants, who ranged across a broad spectrum of businesses, "overwhelmingly reported that they had unrealistic expectations concerning what the tools could do for the organization. This is particularly true for the short term. In fact, there may be no measurable short-term benefits."

However, the report says, most companies did conclude that CASE held promise of significant long-term gains.

Problems still possible

Even assuming that all the other hurdles are overcome, problems can arise when it comes to deciding who will manage a new CASE system.

"We went through all this in the database area some years ago," Merlyn reports. "We gave database management to programmers: at best, we got administration; at worst, chaos. It took 16 years to come around to the independent function of database administrator."

Consultants and, to a mounting extent, users themselves are evolving numerous ways to cut through the seemingly interminable problems that add up to CASE resistance.

Simple awareness of the problems can take potential users a long way, particularly when it comes to the cultural and political aspects, says CASE Associates' Sharon.

"Be sure you understand your parents," he says. "Know where you came from. If you don't respect the 20 to 30 years of evolution that went into your corporate culture, you're going to get nowhere with your attempts to implement CASE."

CASE implementation "will follow as long as there'a training," says Pitney-Bowes' Stevens. Stevens' own company was involved in a combination approach — hire some outside experts, but develop in-house training capability as well.

The inside development, he says, is critical. "If you depend 100% on outsiders, you're in trouble because when those people are gone, they're *gone*."

Not to be overlooked, most CASE observers agree, is the simple fact that time is on CASE'a side. CASE is in its infancy. The more that is known, written and especially discussed user-to-user about the CASE implementation experience, the more the right questions will be asked — and answered.

Says Arthur Young'a Wagner, "We're trying to do in a few years what it took 100 years for civil engineering to do. The whole CASE brouhaha might be the catalyst we need to get us to start acting like engineers and stop acting like an arts-and-crafts profession."

"Price is a big issue in CASE implementation," says Jim Stuart, data administrator at Puget Sound Power & Light Co., an investor-owned utility company

Continued on page 50

First hurdles

The main deterrents to CASE implementation currently are expense and the lack of a proven track record

SOURCE: *COMPUTERWORLD* EDITORIAL ADVISORY BOARD SURVEY
CW CHART: FRANK C. O'CONNELL

How computers are changing the way we work

W. Michael Blumenthal
Chairman and CEO
Unisys Corp.

Amidst the economic uncertainty of 1989 and beyond, the top priority for management will be to increase the pace and quality of innovation and, therefore, the competitiveness and profitability of their enterprises.

In company after company, CEOs and CFOs express the conviction that the key to achieving this objective is to exploit the use of information systems. These business leaders talk about their keen interest — and at times their impatience and frustration — first in understanding and then in optimizing the payback they are getting from investments in computer and communications systems.

Consequently, the predominant trend in information systems in the future will be that business executives will take a much greater interest and personal involvement in making decisions about information systems.

Moreover, CEOs and CFOs realize that the very concept of "payback" needs new definition in the world of the '90s. While the issues of whether a computer system is doing its job efficiently and cost-effectively will still be addressed, a more important issue will be whether a company's computer systems are being used for the best possible purposes.

In this broader context, the cost of an opportunity lost because of a bad choice of computer systems must be measured in terms not only of lost profits, but of lost competitive position or market share.

As a result of this more activist analysis and management involvement, some of our industry's oldest myths and assumptions will be challenged by the fresh candor of senior managers.

They will ask such questions as: Is the best system the cheapest one or the one whose total productive lifespan is greater than a competing system? Why standardize on one proprietary operating system when open systems based on standards and hardware-independent applications give us so much more flexibility? Why is our application backlog always so heavy? And which vendor can help us solve the problem most effectively?

Moreover, the rapid advancement of information technology will not only solve formerly unsolvable problems, but challenge management to find innovative, productive and profitable uses for these powerful systems.

In 1989 and beyond, four technology areas, in particular, will account for most of the growth in the information systems industry:

Mainframe systems will play revitalized, innovative roles in implementing a company's competitive strategy. Large, highly fault-tolerant systems will provide real-time transaction processing; but in addition, they will more and more be the "super servers" of vast distributed systems of PCs, workstations and microcomputers — thus ensuring corporate database integrity and providing powerful network management services.

Open systems based on Unix System V will provide a new level of cost-effective, vendor-independent computing and flexibility that will directly challenge management to automate for immediate productivity gains, as well as create applications to generate new revenue streams and profits.

Software application design, generation and maintenance tools will be used to eliminate application backlogs. What is more, these sophisticated programming tools will increasingly make the difference among operating systems transparent to users by allowing them to transfer applications with ease from one system over to another.

Finally, networks capable of moving multi-media information instantaneously around the world will challenge all parts of an organization to use information for real-time competitive advantage.

The availability and power of these information systems will continue to give managers more tools and options for identifying and capitalizing on new opportunities. The contribution these systems can make will play a fundamental role in business strategy and in the way managers plan for greater competitiveness. •

Announcing International Data Corporation's Annual Conference

STRATEGIC PLANNING FOR DATA PROCESSING EXECUTIVES: WHAT'S AHEAD IN THE NEXT 36 MONTHS

January 18-
Grand Hyatt,
New York

January 24-
Marriott, Downtown Chicago

January 26-The Biltmore, Los Angeles

Each presentation at this executive-level conference will include specific analyses and recommendations for data processing management and planning for the next 36 months. Question and answer segments will give you the opportunity to have IDC experts personally address the issues that are keeping you awake at night.

This intensive one-day session will address five very specific segments of the corporate data processing environment:

- Large Systems Hardware
- Software Trends and Management
- Storage Devices
- Small Systems and Personal Workstations
- Applications Development

8:00-9:00
Registration/Continental Breakfast
Welcome and Introduction
Thomas Wilmott
Senior V.P., Technology Services Group
Systems Software Strategies & Direction
Robert P. Tasker
V.P., Software Research Group & IBM Advisory Service
Strategies for Peripherals & Associated Software
David Vellante
Director, Peripherals Research
Strategies for Large Processors
Curt Beaumont
Director, Systems & Peripherals Technology Service

12:30
Luncheon
Strategies for Microcomputing
Aaron Goldberg
V.P., Workstation Research Group
Strategies for Software Engineering
Ken McPherson
Director, Software Services
Mid-Range Strategic Directions
Terry C. Shannon
Director, DEC Advisory Service
Cocktail Reception

Who Will Attend? Data Processing and MIS Professionals with operational, strategic or investment responsibility for corporate data processing.

Register Today! Seating is limited. Register now to avoid disappointment. Contact Paula Zinck at (800) 343-4952. In Massachusetts Call (508) 872-8200.

IDC

Sponsored by International Data Corporation, the world's leading research, analysis and consulting firm for the information industry.

An International Data Group Company, 5 Speen Street, Framingham, MA 01701

The power to make or break products in the computer industry begins with a few powerful people. Consultants. And analysts. When they talk, we listen.

On IDMS/SQL: "Cullinet has delivered as promised—a relational database management system for the DEC VAX with superior performance, reliability and security."
—Charlotte Walker

On KnowledgeBUILD: "What vendors offer in the way of development tools, is in my mind, an increasingly important distinction. Cullinet is in the front of the pack on performance, but it's the power and sophistication of their KnowledgeBUILD toolset that gives them the edge for tomorrow."
—Michael Braude

On VAX and mainframe connectivity: "A clear demonstration that Cullinet now offers not only a powerful database and a rich development environment for the VAX, but also an architecture that permits a simple transparent exchange of data between a mainframe and VAX."
—Charlotte Walker

On the future: "Cullinet has given us a good example of strategic product development. I expect they will shortly evolve this architecture to the point where it is CPU independent. And they will be able to port it from the VAX to any other platform with full power and functionality intact."
—Michael Braude

In the race for greater performance and productivity, you can't afford to settle for less for your VAX than the most powerful database and tools available: IDMS/SQL and KnowledgeBUILD.

Faster than the competition. Able to build on each other without compromising efficiency or flexibility. Giving you a product you can build on. And on. And on.

Just ask the most powerful people in the business.

Or write Cullinet Software, Inc., Marketing Services, 400 Blue Hill Drive, Westwood, MA 02090-2198.

Call Cullinet today about an IDMS/SQL Seminar near you. 1-800-551-4555.

Cullinet®
The power to build on.

Charlotte Walker, V.P., County NatWest Securities, U.S.A.

H. Michael Braude, V.P. and Director, Software Management Strategies, Gartner Group, Inc.

CASE

CONTINUED FROM PAGE 46

based in Bellevue, Wash. "Any MIS director is going to choke at seven figures for a tool to help programmers — especially when you're talking about another half a million for a repository and $10,000 for each 386-type workstation."

Already sold on CASE as a concept, Bath Iron Works made its initial tools decisions based on functionality and price, Sanford says. It opted for a package from New Haven, Conn.-based Cadware that met the Maine shipbuilder's needs at one-quarter to one-third the price of the current market leaders, he claims. "You can't justify spending the kind of money the market leaders are looking for for something unproven," he says.

Not everyone, however, agrees that price is, or should be, a barrier to getting on with CASE. "Price isn't in my list of the top five problems facing CASE, or in the top five in any survey I've ever seen," Case Associates' Sharon says.

Deceptive pricing

For one thing, he points out, the lofty prices listed by the market leaders are highly deceptive. Aggressive discounts that apply in most seriously undertaken implementation situations make the prices a lot lower than they look. Sharon speaks scathingly of companies that set out to capture CASE market share based on drastically lowered prices; to emphasize the up-front cost, he says, is to lead with the wrong edge.

"For a large company, CASE implementation becomes an integration issue right at the outset," Stevens says. "If tools don't have an open architecture, we won't even consider them."

Tool integration must reach beyond data exchange, says Sharon. "Even if tools exchange data, I still might want to fine-tune," he says. "The question becomes, How open is your architecture?"

Possibly because the integration problem looms so large, so early in the game, solutions are already pouring forth from a variety of sources. Individual tool vendors are increasingly aware that an isolated CASE product is less likely to sell.

Many CASE observers say they believe that true integration will be achieved only when standards are imported into CASE. "No one vendor has the whole solution," says Merlyn, who considers lack of standards a definite entry on any list of the leading barriers to CASE implementation. "And even if they do, it's the whole solution from their viewpoint, not from each individual user's. Integration is highly personal; it has to be one-on-one," he claims. Such a need, Merlyn adds, can be met only by standards for such standbys as repositories, human interfaces, data types and methodologies.

Hurdles

The barriers in the way of broad-based CASE use are many; the emerging means of surmounting such barriers, however, are even more. It is a good thing that they are, for there is a widespread view that the CASE debate has shifted from "whether or not" to "how and when."

"Fortunately or unfortunately, depending on your view, most of the major systems development technologies are rapidly changing and adopting a CASE perspective," CASE Research concluded in its 1988 Annual Survey. "Also, information management technologies are no longer considered 'back office' functions; they are of strategic importance to the competitive survival of businesses."

These factors, CASE Research reports, lead to the recognition that "CASE must be exploited now. You simply cannot afford to wait." •

CASE jury still out

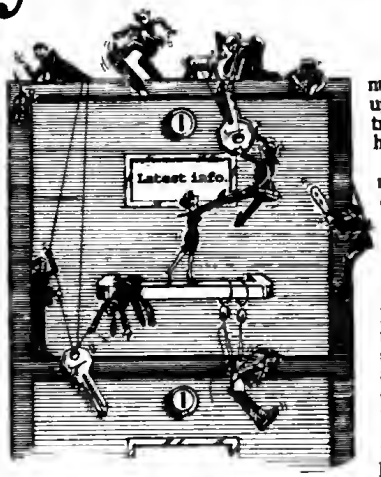
When one consultant definitively stated that the high cost of CASE tools "isn't in my list of the top five problems facing CASE, or in the top five of any survey I've ever seen," he hadn't seen *Computerworld's* — where it is No. 1.

In a survey completed last month, 60.5% of the 154 top MIS executives who participated in a study conducted on behalf of CW targeted the expense factor as an entry barrier to CASE. In addition, 18.4% listed the expense of training as a reason for holding back on CASE implementation.

Other than the warning signals sent out by the dollar sign, however, the survey results implied that the jury is still out when it comes to CASE. The benefits of CASE have yet to be demonstrated, 30.8% of the respondents said; 38.9% pointed to too [illegible] tools and too few standards as a deterrent toward [illegible]

Unlocking mainframe resources: word processing.

Why are so many end user reports outdated before they're written?



Timely, efficient downloading of end user report data can be a problem for busy DP departments. It's not always possible to drop ongoing work to supply other departments with the fresh data they need from your IBM mainframe.

EdWord® is the key. Now there's a way out of the report support bind: mainframe word processing for end users.

With EdWord software, any end user with a 3270 can use the efficiency and power of your IBM mainframe for interoffice memos, sales letters, proposals, outlines, summaries – and, of course, reports.

Key EdWord benefits. EdWord will give you and your end users true office-of-the-future advantages.

Timeliness. EdWord reports are always current because they're written right from mainframe data. No downloading is ever necessary.

Electronic Data sharing. EdWord documents can be sent online to any number of end users for update, approval, or as electronic mail. Or they can be hard-copied. Or both.

Easy to use. EdWord has no complex formatting codes or procedures. Menus guide users from start to finish; editing is performed at the touch of a key.

Security and backup. EdWord provides controlled, secure access to selected data. Backup is automatic because data comes directly from the mainframe.

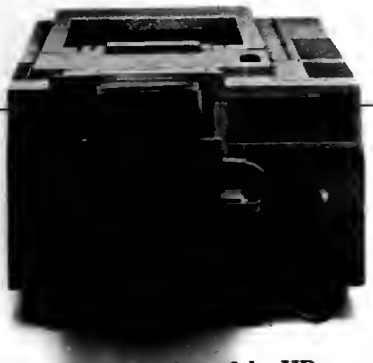
Trax is the key. These are only a few EdWord benefits. Others include a built-in spelling checker and optional integration with ESS,® our end user spreadsheet package. Join the more than 500 companies using Trax software products (and get a free 60-day trial period). Contact Tom Cox at 10801 National Blvd., Los Angeles, CA 90064. Telephone: (213) 475-TRAX.

Trax Softworks, Inc.

Unlocking end user productivity on your IBM Mainframe.

One of the most important reasons for buying our new LaserJet IID printer is on the other side of this page.

One of the most important reasons for buying our new LaserJet IID printer is on the other side of this page.



The latest member of the HP LaserJet printer family prints on both sides of the paper. But that's just the icing on the cake.

The LaserJet IID printer is full of new ideas for making paper-handling easier and more efficient.

An envelope feeder accessory, for one. Instead of having to feed envelopes manually, our new printer does it automatically.

You wanted more paper trays. So the LaserJet IID printer has two of them, each with a 200-sheet capacity. Give us more fonts, you said. And LaserJet Series II compatibility. Done!

So now you have a choice of two HP LaserJet printers. Both with that superb quality for text and graphics you've come to expect from Hewlett-Packard.

All good reasons to call **1-800-752-0900, Ext. 297A** for the name of your nearest dealer.

HEWLETT PACKARD

© 1988 Hewlett-Packard Company PE12807

LANDSCAPE

1989 will be the year of DB2's coming-out party

But is IBM's DBMS ready for the rigors of adulthood?

BY AMY CORTESE

Most industry observers would agree that DB2 has become the standard for mainframe database management systems. But like the 3-year old emperor of China, DB2 may not yet be mature enough to live up to the responsibilities of the throne.

There is irony in the fact that IBM's DB2 was accepted as a standard by much of the industry before it was able to handle the high-volume production applications that a mainframe DBMS should handle. In most cases, DB2 is still used for information center-type applications, not for the applications that run a business.

1988 will go down as a critical year for DB2, one in which many announcements were made laying the foundation and direction for DB2's future, promising that DB2 will grow to be a real production-class system. Users saw 30% to 35% performance improvements in 1988 as well as the announcement of much-needed functionality such as referential integrity and data sharing.

In the coming year, IBM must start delivering on its promises. As production applications start coming on-line, DB2 will be put to the test. This will be the year that DB2 grows up and the irony is resolved.

Inroads on IMS

DB2 is just now beginning to be utilized for new production applications formerly reserved for IBM's IMS. "We are now reaching a point where DB2 performance is acceptable to build business applications," says Bill Franks, group manager of technology at Frito-Lay, Inc. "I still don't think of it as a true performance DBMS, but we're starting to feel more comfortable with it." Frito-Lay is now using DB2 for decision support in conjunction with IMS. Although the company will use IMS for years to come, Franks will consider developing new business applications under DB2.

Another DB2 site considering production applications is Banc One Services Corp. in Columbus, Ohio. "Performance improvements have made DB2 a whole lot more appropriate for production applications than in the past," says David Van Lear, president of Banc One Information Services. "The number of transactions per second in the past prohibited many applications, so most DB2 applications were ad hoc rather than production environments."

A recent survey of DB2 users conducted by International Data Corp., a market research firm in Framingham, Mass., found that the application mix is shifting from information center to production, with a surprising 47% of the respondents indicating that production applications were their primary applications.

Many DB2 users are pursuing a dual database strategy, using IMS for production applications that require high volumes of transactions and DB2 for query- and information center-like applications.

Ron Perlow, data manager at Manufacturers Hanover Corp.'s Corporate Systems division, says his organization, like many, is using DB2 as a query facility for IMS data. Each is well-suited to its own applications, he maintains, but DB2 needs more functionality, and IMS lacks a query facility. The dual database strategy means that the two databases end up being out of sync much of the time. Perlow has asked his developers for a strategic direction to go with either DB2 or IMS.

IBM has made improvements to DB2 that make it a viable transaction-processing DBMS for the first time. However, many of the pieces in IBM's database strategy are just coming together. Roberto Montero, a database analyst at Chevron Information Technology, believes the lack of development tools in the past held back many applications. "We would have had production applications four years ago if we had a delivery tool," he remarks. IBM's Cross Systems Product is widely regarded as inadequate, but in the past year, a vast array of tools made by third-party vendors have become available for DB2.

TIM LEWIS

Some contend that DB2 still needs critical functionality, such as a transaction manager, before it can be used for high-volume transaction processing. The problem, according to Gig Graham, an analyst at the Stamford, Conn-based Gartner Group, Inc., is that new DBMS technology is being used with old transaction management technology, like IBM's CICS and IMS.

Many believe IBM will have to improve CICS's transaction management capabilities or come out with a completely new transaction manager for DB2 to really be up to par.

Steve Laino, manager of database administration at Depository Trust Co., believes a lack of understanding of how DB2 works has kept many users from implementing production applications. Depository Trust currently has 40 production applications running under DB2, representing 13 million to 15 million SQL commands a day. Laino's shop processes extensively through CICS, he says, and although CICS is resource-consumptive, he has not experienced any bottlenecks. Laino maintains that as long as the resource-control table that resides in CICS is constructed properly, CICS can manage transactions just fine.

Performance is critical if DB2 is to become widely used for production applications. Performance and referential integrity are prerequisites to allow distributed environments in the future. Until these capabilities are

Cortese is a *Computerworld* senior writer.

established, real distributed processing is not realistic.

In October, IBM announced the first stage of its plan to allow distributed data in DB2. Along with referential integrity, IBM announced the availability of a single-update, single-read capability between two DB2 systems and initial support for multiple-read, single-update capability among multiple DB2 systems.

This is the first step for many users who envision distributed environments in the future. Distributed data management is still a ways off, and IBM is slowly putting its strategy in place.

Different strokes

Distributed processing means different things to different people. Most distributed processing today consists of simple transactions, commonly called remote requests.

In this type of transaction, the user queries a remote database and recieves a copy of the original data. This method is fine in many cases, but since the copy does not reflect changes made to the original database, the data is not up-to-date for long and the systems are quickly out of sync.

The next phase of distributing access to data is what IBM has called the "remote unit of work," wherein a collection of related SQL statements constitutes a unit of work. In a remote unit of work, a user can read and update a single, remote DB2 database within a unit of work.

The transaction will go through only if all the statements have been successfully completed. If the unit of work is completed successfully, the transaction is committed; if not, the data is rolled back to its original state. While the application is executing, the data is protected by a locking mechanism. If multiple DB2 DBMSs need to be accessed, multiple units of work must be issued.

This capability is currently available under IBM's VM/SP with SQL/DS. A remote-unit-of-work capability was announced for IBM's OS/2 Extended Edition a year ago; in October, it was announced for DB2.

The next stage of distributed data is called, using IBM terminology, the "distributed unit of work." The new functionality in this technology allows access to multiple relational DBMSs within a single transaction, or unit of work, rather than just one.

This capability was aired in the October announcement of DB2 Version 2 Release 2. Under MVS/CICS or IMS/DC, a user will be able to read any number of local or remote DBMSs and write to the local DBMS. However, in a TSO or batch environment, a user could read many and write to a single local or remote DBMS.

The next phase in distributing data is the distributed request. In this distributed nirvana, all transactions that can be done locally can also be performed in a distributed environment. This capability, however, is a long way off.

Although distributed processing is being widely discussed currently, two things are clear: It will be several years before this technology is here, and users — excluding a handful on the leading edge of distributed processing — do not need it right away.

The main impetus for distributed data access is to let end users have access to the information they need to make decisions and do their jobs — regardless of where the data resides. This can be done by providing access to data, without the data itself being distributed.

For instance, at Huntington National Bank in Columbus, Ohio, John Voss, systems development manager envisions one database accessed by many branch locations, providing intelligence at the local level. Although not doing any distributed processing today, he sees the customer information applications coming on-line in the 1989-90 time frame.

Voss says whether Huntington needs true distributed processing still is not clear. "It sounds wonderful, but you have to look at the costs associated with it," he says, adding that new data admininistration and security problems are created.

Nineteen eighty-nine will see the implementation of IBM's announced directions for DB2 — including referential integrity and data sharing between DB2 databases. In addition, users will

You'll never have to wait for a mainframe again.

Microsoft just eliminated a 3000-pound headache for mainframe programmers. With Microsoft® COBOL Optimizing Compiler 3.0.

Now instead of endlessly waiting for mainframe time, you can bring your COBOL programs right down to the PC on your desk. Suddenly you've got control unknown in other platforms, as well as serious speed and power.

You've got full MS® OS/2 support to let you break the 640K memory barrier.

You've got fast execution because Microsoft COBOL is now a native code compiler.

You've got a rich development environment thanks to the Microsoft COBOL Animator source level debugger, Microsoft Editor and other powerful utilities.

One final assurance. Because Microsoft COBOL 3.0 is now mainframe COBOL compatible, you'll enjoy a seamless flow of source code between mainframe and PC environments.

Feel free to also enjoy the highly technical information in the adjacent column. Then call us at 800-541-1261 for more information and the dealer nearest you.

The mainframe wait is over with Microsoft COBOL 3.0. Appearing soon on a PC near you.

Microsoft®

© 1988 Microsoft Corporation. Microsoft, the Microsoft logo, MS and MS-DOS are registered trademarks of Microsoft Corporation. Microsoft COBOL Optimizing Compiler version 3.0 is based on COBOL/2 from Micro Focus.

see further performance improvements that take advantage of the vendor's Enterprise Systems Architecture. IBM is also expected to unveil the pieces of its long-awaited repository.

Many users today are building systems in anticipation of these capabilities being available when their applications are ready.

So this year will be one of waiting for many users who are anxiously hoping IBM will deliver on its DB2 promises. ●

Microsoft COBOL Optimizing Compiler Version 3.0 for MS OS/2 and MS-DOS®

Complete COBOL Solution for Application Maintenance and Development on the PC.

- Develop and port large mainframe applications on the PC
- Break the 640K barrier with OS/2 support including dynamic link libraries and multi-thread support. NEW!
- Develop programs that run in both MS-DOS and OS/2. NEW!
- Compatible with several different COBOL dialects. (IBM® VS COBOL II,™ IBM OS/VS™ COBOL, IBM SAA, Data General, and others.)
- Call Microsoft C and Macro Assembler routines. NEW!
- HUGE memory model allows data items to be greater than 64K. NEW!
- Full network support with record and file locking including Novell. NEW!

Powerful COBOL Development Environment

- Animator source level debugger. NEW!
  Trace execution, backtracking, breakpoint DO statements, and periodic breakpoints.
- Microsoft Editor, the programmer's editor for both MS OS/2 and MS-DOS. NEW!
  Reconfigurable and extendable editor that even lets you run your programs from within it.
- Incremental linker for MS OS/2 performs partial links up to 20 times faster than a full link – only changed modules are relinked. NEW!

ANSI 85 COBOL support. NEW!

- Certified HIGH by National Bureau of Standards.
- Structured language enhancements:
  Scope delimiters
  In-line PERFORM statement
  CALL BY CONTENT statement
  EVALUATE statement
  Negated conditions
  Global variables
  Reference modifications
  Nested programs

Native Code compiler with fast execution. NEW!

- 10x faster computations than MS COBOL 2.2
- 30% faster I/O than MS COBOL 2.2

MIS-consultant relationship more a matter of faith than fact

BY MARK BREIBART

Thousands of dollars are spent by MIS managers each year on consultants' advice. Yet there is no way to measure the value of this service, and user needs or business trends are often more influential in determining a company's technology direction than an expert's recommendation.

Nevertheless, managers continue to use consultants to gain additional insight, and the relationship between consultant and manager, like religion, is a matter of faith.

"These forecasts help stretch our thinking, but you have to look at your own company and its needs," says John Callahan, director of information resources management at Hershey Foods Corp. in Hershey, Pa. "You have to have your own agenda."

MIS managers keep the consultants' advice firmly in its place — as raw data for their own evaluations or as support for a case they are trying to make. When it comes to crunch time, there is no doubt whose word wins.

"If there's a discrepancy between what I think and what I read, we look harder," says Mark Schmidt, director of technology at Wal-Mart Stores, Inc. "But ultimately, I have to trust my own senses."

Some executives are skeptical about forecasters. John Langenbahn, vice-president of information resources at Dayton, Ohio-based Mead Corp., says he takes it all with a grain of salt. "They've been projecting things for 10 to 15 years, much of which never happens," Langenbahn claims. He says he favors the pragmatic approach of waiting to see what really develops.

But such strenuous doubters are in the minority. Most managers are hungry for all the insight they can get.

All industry analysts are not created equal, however, according to discussions with some 20 information executives. Most often mentioned as being useful were those, like Gartner Group, Inc. in Stamford, Conn., that emphasize the technologies and their implications for MIS planners. Others that managers often turn to include Index Group, Inc. in Cambridge, Mass., or the Big Eight accounting firms, which focus on top-level strategies and training.

Balloon busters

Cautious before committing themselves to a new technology, especially one surrounded by the balloons and banners of the promoters, many managers call on their consultants to puncture the hype.

When artificial intelligence was first gaining notoriety, Callahan found it intriguing but was not sure how well it fit in with his "rather parochial" industry, which tends to stay away from experimental technologies. He checked out the AI vendor himself, then sought a second opinion from the computer consultants at Arthur Andersen & Co. in Chicago, Hershey's accounting firm. He wanted to know "whether this was a visionary approach that we should get involved in or whether we should use the Missouri approach to see if AI would stand the test of time." Arthur Andersen recommended that he wait. He did, and he is glad he held off, but future evaluations of AI are part of his five-year plan.

MIS executives often need to check out the vendors as well as the technologies. Before committing large resources, managers want to make sure the supplier will be around for a few years and not follow other high-tech shooting stars into oblivion. Yet, this is often an analysis they need help with.

"We are not interested in having a staff large enough to do all those things ourselves, though we do have our own in-house experts," says Hans Huppertz, director of information systems at Dow Chemical Co. in Midland, Mich.

> "BY crystallizing the diverse opinions, [analysts] smooth the whole process of decision making."
>
> PORTIA ISAACSON WRIGHT
> FUTURE THINK

When asked by Dow's agricultural research division about putting Oracle Corp.'s relational database on its IBM mainframe, Huppertz made one of his frequent calls to the Gartner Group for an evaluation of the future health of the Belmont, Calif., firm. "It's like buying a little insurance for our own opinions," he says. When the Gartner Group came back with a positive report, the division got the go-ahead.

The benefits from new hardware technologies are often more obvious — or at least easier to judge — than those of new software. But for planners, the timing of future purchases can be everything. For example, a Gartner Group forecast that erasable optical disks were coming down the road in a year or two changed the plans of Walter Perkowski, vice-president of computer operations at Republic National Bank of N.Y. He decided to put off buying more current-model hard disks and see if the optical devices really met Gartner's predictions. He's still waiting and will wait for "another six months or so," he says.

At McGraw-Hill, Inc. in New York, Richard Shriver does all he can to be prepared for new product announcements. He uses the forecasts of outside subscription services and of in-house experts, and he talks "to people who profess to know as much as anyone outside the proprietary halls" of the vendors. But since the unexpected is always possible, he hedges his beta. "We go to great lengths to defer major mainframe purchases whenever we can," says Shriver, McGraw-Hill's senior vice-president and chief technologist, just in case an unanticipated product announcement is lurking around the corner. A well-timed delay of even a month could save the company up to $500,000, he adds.

Shaping thoughts

Beyond products and beyond trends, the research groups help shape the unconscious thinking of information executives in ways that cannot be pinned down completely. "It's the kind of thing where you get an 'Ah ha!' when you read it, but two weeks later you don't remember where you got the idea from," says Joseph Vincent, director of technical planning at Louisville, Ky.-based Humana, Inc.

What is quite clear, however, is that no matter what analysts say is happening in the industry overall, managers decide on their direction based on their own applications and internal needs. Langenbahn, for example, who runs a large, multilevel IBM Systems Network Architecture network with mainframes, minis and micros, perked up at the notion expressed by some analysts that one of those three levels can be eliminated. Going to a two-tier setup would save him a lot of money, but, he says, being able to do it really depends on the needs of Mead's specific applications, not on what is going on elsewhere.

Others echo that sentiment. When Gencorp, Inc. reorganized in the wake of a hostile takeover attempt, Linda George, the company's director of information services, needed to rethink her computer architecture. After carefully evaluating the Akron, Ohio, company's applications portfolio, she switched from IBM mainframes to "lots of PCs" and minis made by Wang Laboratories, Inc.

There is, however, no clean demarcation between information managers' plans for their company and consultants' views of where the industry is going. It is more like a continuous feedback loop or barbershop mirrors, whose opposing images bounce endlessly back and forth.

Portia Isaacson Wright, president of Future Think, Inc., points out that consultants' conclusions are developed for their subscribers only after speaking with countless users and vendors. When a consulting group asks 200 users for their opinions, for instance, "there could be 200 variations on a theme." That would be chaos for the managers. By "crystallizing the diverse opinions," she says, the analysts "smooth the whole process of decision making.

"The beauty of it all," she adds, is that each user then gets a report that is really a distillation of the views of many users. And round and round it goes. ●

LANDSCAPE

The year of alliances makes for strange bedfellows

Market demands force many industry giants to link up

BY DOUGLAS BARNEY

Vendors are learning to play by a new set of rules. No longer is it acceptable for them to lock users into a totally proprietary system — it just won't sell. Instead, both hardware and software vendors are having to change the way they operate in order to meet user demands for the best overall solution and to allow incompatible architectures to work together.

The biggest shift in vendor operations has been the rise of so-called strategic agreements that hopefully turn into strategic relationships — which hopefully create strategic products.

Some strategic alliances work. Others fall apart because of the squabbling and political infighting that is the very nature of competition. What follows is a look at some of the most important strategic alliances, most of which have been announced within the last year or two. All of these fall into categories: It Worked, It Failed or Yet to Be Determined (YTBD).

YTBD: DEC and . . .

DEC and Tandy. Earlier this year, Digital Equipment Corp. conceded defeat in selling its own PCs. It tried the Rainbow, which failed because it was incompatible with the standard IBM established. Then it tried with the Vaxmate, a network-oriented PC that failed because of its high price, lack of color and serious problems with overheating, all of which were well documented by the press.

DEC is preparing to take a fresh crack at this market by selling IBM PC-compatible machines custom-built by Tandy Corp. Details of the products will not be announced until early next year, and only based on those details can users and analysts gauge DEC's chances for success. But if the products and the prices are right, and if DEC salespeople are effective and add value such as advanced networking, DEC may finally succeed in the PC market. But if any of these conditions are not met, DEC will fail again.

Analysts say they believe that DEC may have finally hit on the right approach and that the company will work hard to make sure it succeeds. According to John McCarthy, director of professional systems research at Cambridge, Mass.-based Forrester Research, Inc., DEC will finally succeed simply because it will put in the necessary effort.

DEC and Compaq. Prior to the DEC/Tandy announcement, the minicomputer giant copped a deal with Compaq Computer Corp. This deal is much less ambitious than the Tandy arrangement, essentially calling for cooperation to ensure that Compaq systems work effectively on DEC networks. If the companies work well together, Compaq machines will be highly compatible on DEC networks. Knowing Compaq, even if the two do not work well together, Compaq machines will be highly compatible on DEC networks.

The deal is viewed as a bit of a no-brainer, with little chance of failure.

DEC and Apple. DEC has been cranking out strategic alliance after strategic alliance, a real break with its proprietary tradition. One that caught a lot of attention was its alliance with Apple Computer, Inc.

The alliance was a recognition that VAX shops were being increasingly filled with Apple Macintosh computers. Because few of these shops were buying Vaxmates, it was no loss for DEC to endorse, support and help sell Macs.

In terms of lifting the visibility and respectability of the Macintosh, the agreement has been wildly successful, analysts say. But there is another, co-development aspect that has yet to be proven.

Apple and DEC are supposed to be developing tool kits that will provide tighter integration between Macs and VAXs. Until these are fully fleshed out, available and proven, the DEC/Apple alliance is YTBD. Whether it succeeds or not, its importance has clearly been diminished, because DEC will soon be pushing Tandy machines, analysts argue.

Others YTBD

Sun and AT&T. This alliance has resulted in no product shipments, but the very announcement shook the foundations of the entire computer industry. Earlier this year, AT&T joined forces with workstation upstart Sun Microsystems, Inc. to jointly develop a version of Unix that will come complete with a graphical user interface called Open Look.

The agreement was supposed to create, once and for all, a single Unix standard. Instead, it splintered the industry into hostile opposing camps. AT&T, however, has been mustering its forces and now boasts support from Unisys Corp., NCR Corp., Amdahl Corp., NEC Information Systems, Ing. C. Olivetti & Co. and Toshiba America, Inc. This group, now dubbed Unix International, is gaining steam and may well steamroll the opposition.

OSF. The Open Software Foundation was created to blunt the effect of the AT&T/Sun alliance. The OSF draws together firms that compete against each other with venom and aims to develop an open, licensable version of Unix. The key players include DEC, IBM, Apollo Computer, Inc. and Hewlett-Packard Co. —

Barney is a *Computerworld* senior editor, microcomputing.

but, so far, no AT&T or Sun.

There is still disagreement as to whether the OSF will ultimately succeed. "One or two key defections and it's history," Forrester Research's McCarthy maintains. Other analysts, such as International Technology Group's Clare Fleig, say they believe the sheer weight of the players will ensure success.

Microsoft and IBM: So far so good. Microsoft Corp. Chairman Bill Gates must thank his lucky stars that IBM chose MS-DOS as the operating system for its original IBM Personal Computer. Gates parlayed that deal into a billion dollars worth of personal wealth and a company that sits at the very top of the PC software heap.

Gates has struggled to keep wily IBM on his side. He fought to get Armonk to support OS/2. It did. But the bigger challenge came on the interface side. Gates, a graphical user interface maven if ever there was one, battled tooth and nail to get IBM to implement Microsoft Windows as the user interface for OS/2.

IBM agreed, with one twist. Windows would have to be rebuilt, and IBM mainframe-oriented graphics technology would have to be added. In addition, Windows was not only changed, but renamed Presentation Manager.

Things are still looking relatively good. IBM has agreed to support a 32-bit version of OS/2, which is likely to keep the relationship strong for several more years.

But some cracks are beginning to emerge. IBM is licensing a user interface from Next, Inc. that, by its very definition, will compete with Presentation Manager.

"Without Microsoft, IBM would just be a ship in a storm without an anchor," McCarthy says; he argues that the alliance will remain strong.

Ashton-Tate, Microsoft and Sybase: YTBD. Critics were immediately skeptical. How could two software companies that were making clear moves into each other's markets possibly agree on anything? they asked. Well, they did agree to co-market some multiuser database software called SQL Server, and Ashton-Tate, Inc. did agree to design Dbase IV to act as a front end.

But SQL Server ship dates have slipped, and Microsoft has reportedly been displeased with Ashton-Tate's progress on Dbase IV 1.1, the front end to SQL Server. The whole deal almost fell apart after a well-publicized spat between Bill Gates and Ashton-Tate Chairman Ed Esber.

Gates' temper flared after he heard that Ashton-Tate planned to distribute SQL Server through Novell, Inc. Novell is Microsoft's key rival in the local-area network operating systems market, and letting such a rival resell a Microsoft product simply would not do. Gates forced Esber to call off a press conference and cancel the agreement with Novell.

Still, the organizations insist that all is well and that the relationship between Microsoft and Ashton-Tate is strong. But other cracks are starting to appear. Ashton-Tate has licensed another multiuser engine from Interbase and has pledged to support OS/2 Extended Edition, which by definition competes with SQL Server.

On the other hand, Microsoft is busy readying its own end user-oriented PC DBMS that will work with SQL Server. This, by definition, competes with Ashton-Tate's Dbase. Can these two partners/competitors hang together? Only time will tell. For now, their relationship is rated YTBD, and the product is rated Yet to Be Delivered.

IBM/Stratus: YTBD. This agreement is one of a kind for IBM. The deal that calls for IBM to resell Stratus Computer, Inc. fault-tolerant computers — renamed the IBM System/88 — is a radical departure for the mainframe monolith, which develops most of its own systems. But that departure has gotten IBM into a lucrative and growing fault-tolerant market and has made up some 25% of Stratus' revenue, providing much-needed cash for development and growth.

Analysts say the deal is working out well and point to IBM's own scaled-back fault-tolerant development efforts as proof. So far so good.

EISA: YTBD, but looking rough. At first blush, many analysts thought it looked great: Compaq and eight other PC clone vendors rallied together to develop an alternative to IBM's Micro Channel Architecture bus. These nine firms that make up the Extended Industry Standard Architecture (EISA) pledged to work together on a 32-bit bus that would be available in late 1989.

But savvy observers and users spotted the chink in the armor right away. Some questioned how competing vendors could work together, particularly when there was no defined hierarchy for decision-making. These same critics pointed to a 1986 effort at bus standardization spearheaded by Phoenix Technologies Ltd. that fell apart due to the squabbling of the competing firms involved.

Bottom line for EISA is Yet to Be Built. Because so many EISA members are developing Micro Channel products, many analysts now say they believe that the EISA bus will never be built.

Strategic alliances provide a host of benefits for vendors. For some, it is access to technology and new markets. For others, it satisfies the need for publicity. Users also have a divided lot. Some alliances provide users with products that are impossible to create any other way. In some cases, the fruit of alliances is the bridging together of incompatible systems. But far too often, alliances leave users with nothing but disappointment and thoughts of what might have been. •

UNIX

The UNIX Operating System . . .

offers freedom of choice in software applications and in hardware to buyers and users of multiuser systems. With its connectivity and portability, the UNIX® system spans the range of hardware, from micro to mainframe, and provides one standard, compatible operating environment.

The UNIX System Event . . .

UniForum is considered the premier international UNIX system conference and trade show. For six consecutive years, an impressive gathering of attendees — users and developers . . . buyers and distributors — has profited from the unlimited opportunities to interact and exchange information during UniForum.

UniForum 1989 . . .

will be presented at San Francisco's state-of-the-art Moscone Center. UniForum 1989 will feature a tiered format: vendor exhibits and product demonstrations, intensive all-day tutorials, and marketing- and industry-oriented conference sessions that include technical presentations. Plus complimentary basic UNIX system workshops.

Turning Technology Into Solutions . . .

is the UniForum 1989 conference theme. The full three-day conference, preceded by 20 subject-specific all-day tutorial presentations, will address user application needs and issues, the place for UNIX systems in mass markets, and the future of the UNIX system in the computing industry's next era.

Register Now. . .

Registration for UniForum 1989 exhibits and introductory workshops is FREE. For more comprehensive and application-specific UNIX information and training, UniForum also offers a complete conference and tutorial agenda.

Call:800-323-5155
for details and registration forms.
In Illinois or outside U.S., call: 312-299-3131.

Or Write: UniForum 1989
2400 East Devon Avenue • Suite 205
Des Plaines, Illinois 60018 USA
Fax 312-299-1349 • Telex 556281

UniForum

February 28 – March 2, 1989
Moscone Center
San Francisco, California

sponsored by

UNIX is a registered trademark of AT&T.

UniForum: Turning Technology Into Solutions

Informix is the #1 c
And the only c

To develop your application faster, you need the only 4GL that doesn't rely on COBOL or C to fill in the missing pieces.

INFORMIX-4GL.

A complete COBOL replacement.

Unlike other DBMS products, INFORMIX-4GL is a complete application development language for SQL databases. It's the only 4GL with full screen-building, report-writing and SQL database I/O capabilities designed into a single programming language. Which means it's a real COBOL-replacement-caliber tool. So you'll rarely have to revert to COBOL or C to customize an application.

10 times faster than COBOL. 3 times faster than any other 4GL.

When you leave COBOL and C behind, high productivity kicks in. In fact, with INFORMIX-4GL, you'll be able to deliver even the most complex custom applications at least 10 times faster than you can with COBOL or C. And 3 times faster than with any other 4GL.

Moreover, application debugging and maintenance are a breeze with our INFORMIX-4GL Interactive Debugger. You can view and debug your 4GL source code while the program runs. Even maintenance time will be reduced drastically. After all, with the non-procedural syntax there's less code to maintain. And the debugger makes it easy for others to understand and maintain your code.

What's more, our INFORMIX-4GL Rapid Development

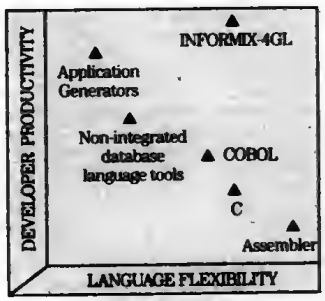
Here's what it takes to make a complete 4GL. And only Informix has it all.

- ☑ Complete report-writing screen-building and database I/O language in a single product.
- ☑ Language comprised of non-procedural statements.
- ☑ Language flexibility equal to COBOL or C.
- ☑ Full SQL implementation.
- ☑ Application portability without recompiling.*
- ☑ Complete source code debugger capability.
- ☑ A 10 to 1 increase in developer productivity.

database in UNIX.
omplete 4GL.

System lets you compile your code in a fraction of the time you'd normally take. And you can port your applications to other operating systems without rewriting or recompiling a single line of 4GL code.*

INFORMIX-4GL is as flexible as conventional languages, but provides all the power of a 4GL with its non-procedural syntax for handling menus, forms, reports and SQL.



INFORMIX-4GL vs. other application-building tools.

Plus it's more portable.

You can take INFORMIX-4GL just about anywhere—MS-DOS, OS/2, VMS, and, of course, most every known version of UNIX. Better yet, it runs on more machines (over 200) from more manufacturers (85) than any other DBMS.

All that and a best-seller, too.

Informix DBMS products for UNIX, including INFORMIX-4GL, outsell their closest competitors by a substantial margin. So if you subscribe to the theory that there is safety in numbers, rest assured. With INFORMIX-4GL, the numbers are on your side.

Free booklet, "How To Choose A 4GL."

For a free copy of our new guide, "How To Choose A 4GL," call or write Informix Software, Inc., 4100 Bohannon Drive, Menlo Park, CA 94025. (415) 322-4100.

And solve the 4GL puzzle. Completely.

INFORMIX

#1 for good reason.

*Obviously, mixed 4GL/C programs or code written to take advantage of specific operating system features may need to be rewritten or recompiled.

Informix is a registered trademark of Informix Software, Inc. UNIX, MS-DOS, OS/2 and VMS are registered trademarks of their respective manufacturers. © 1988, Informix Software, Inc.

In which our hero is paid three eerie visits — or was it just that pizza?

Klooge!

BY GLENN RIFKIN

Ebenezer Klooge lay in his majestic bed, tossing and turning as the wind howled outside his window. It had not been a good day at the shop. The year was winding down; in fact, it was Christmas Eve, and Klooge's staff had made not a dent in the massive backlog that they had started with last January.

Indeed, the addition of the new whiz-kid applications specialist, Bob Batchit, had not produced the expected benefits at all. If anything, the backlog was worse, though Klooge had pushed Batchit without mercy. The pathetic propeller-head might still be at his terminal for all Klooge knew.

So what if it was Christmas Eve? Bah, humbug on all this sentimentality, Klooge thought. The CEO was even meaner than he was. "COMPETITIVE *ADVANTAGE*, KLOOGE!!! NOW *THAT'S* WHAT THIS IS ALL ABOUT, MY GOOD MAN." A productivity increase is really what it's all about, Klooge sneered — a productivity increase, nuts to eggnog. Oh, how he loathed spineless Batchit, who had crept up to Klooge's desk that very afternoon.

"Uh, pardon me, Mr. Klooge, sir. But may I have a word with you, sir?"

"What do you want, Batchit?" Klooge had barked.

"Well, sir, I was wondering, uh, I mean, I was hoping to . . . uh, leave a bit early today. You see, it *is* Christmas Eve, after all, and my family has a goose cooked, and my little son Micro Tim is ill and could hardly play Nintendo this . . ."

"BAH, HUMBUG!" Klooge had screamed. "Back to your workstation or your goose *will* be cooked. You're already getting the whole day off tomorrow, which means bringing the system down *tonight*. Do you realize that we are three months behind schedule on applications requests? That my stat mux is on the fritz, and the CEO wants to know what we're doing about DB2? And they canceled NCC, for crying out loud, so I didn't even get to Vegas this year! Back to your desk, you sniveling bit-sniffer, or you can call Robert Half next week."

And off slouched the stooped, sad-eyed Batchit. Klooge looked at his multifunction 386-chip wrist computer and frowned.

"Bah, it's 5 o'clock and all these geeks will want to leave just because it's Christmas Eve," he had snarled. "Well, I'll get another good hour out of them, anyway."

With that, he had turned toward the staff and bellowed, "CODE, CODE, CODE, GIVE ME COOOOOODE!!!"

Now, as he tossed in his bed, Klooge pulled his nightcap down snugly around his ears. "Damn drafty in here," he muttered as his eyelids drooped. Moments later, the sash to his bedroom window flew open, and the curtains unfurled in a whoosh of cold night air. Flakes of snow swirled into the room as Klooge leapt upright in bed, his eyes wide with fright.

"What is it? Who's there?" he screamed.

Into Klooge's room jumped Charles Wang. "Frank Dodge, I want your company!" he yelled.

"WHAAAT?" Klooge yelled back.

"Isn't this McCormack & Dodge?" Wang asked as he floated above Klooge's bed.

"No!" Klooge replied.

"Ooops, my mistake. Wrong morality play," Wang apologized as he leapt out the window into the night.

Klooge huddled under the bedclothes and shivered. "I have to cut out the pizza with onions before bed," he said to himself.

Fitfully, Klooge drifted off to sleep. The electronic grandfather clock beeped three times in the pitch dark. Suddenly, the window flew open again; wind and snow swirled into the room. Klooge hardly opened an eye. "Where's my Maalox?" he said, groping toward his nightstand.

A huge, ghost-like figure floated in on the wind. The figure wore a white smock and had a plastic pen protector in his pocket. His hair was disheveled, and

Rifkin is a *Computerworld* senior editor.

he wore thick, dark glasses.

"EBENEZER KLOOGE!" the figure bellowed.

Klooge sat bolt upright in bed. "What is this — Grand Central Station? Hey, don't I know you?" he demanded of the apparition, with more than a tinge of fear in his voice.

"What a dummy. Sure you know me. I'm your old DP manager, Jack Nerdley."

"You look awful, Jack."

"I'm a ghost. I've been dead for seven years. If *you* were doomed to wander from data center to data center for eternity with spaghetti code and batch cards tied to your ankles, *you* wouldn't look so hot, either."

"Good point, but you didn't look so great when you were alive."

"Just my luck, I get to haunt a wise guy. Listen, buster, I got news for you. You're next, Mister Hotshot CIO. Took my desk and kept yelling 'CENTRALIZE, CENTRALIZE!' Well, you're in for a long night here."

"What do you mean?" Klooge asked, his eyes widening.

"You'll see. The big guy is sending three spirits down here to see if they can straighten you out. The word is that you are giving the information age a bad name. Keep it up and you'll be schlepping around with me for the next billion years."

"Right, and I'm sure Tom Watson Sr. will drop in for tea tomorrow night," Klooge said.

"OOWWWWWWW," Nerdley howled. "Boy, are you gonna get it. They'll probably chain an old 1401 to your ankle and make you lug *that* around for eternity. Anyway, I'm outta here. Just thought I'd warn you. Good luck; you'll need it."

With that, Nerdley backed slowly out of the room and through the wall. Klooge lay back under his blankets and shivered. "This is giving me a headache," he moaned and then promptly fell asleep.

Inexplicably, the beeper on his digital watch signaled 1 a.m., and Klooge opened a bleary eye. At the foot of his bed was a small figure feverishly counting a large stack of punch cards. It appeared to be sitting but was actually floating transparently above the bed.

"Let me guess," said Klooge. "Ghost Number One."

"You hearda me?" the ghost replied, surprised. "I thought I'd surprise you, get a few screams and squeals. Just for laughs."

"I knew I should have spent Christmas in Florida," Klooge sighed.

"I AM THE GHOST OF SYSTEMS PAST!" the apparition replied. "I've come to take you back, back, back to your own past. Come, there's no time to waste. The time machine is double-parked."

"Get outta here," yelled Klooge. "Johnson, right? You're the wise guy from telecom. Nice outfit, you clown. Now beat it."

"KLOOGE, COME WITH ME!!!" the ghost commanded. And with that, Klooge rose involuntarily from the bed, his nightshirt fluttering in the wind. "WHOAAAA," he wailed as he whooshed out the window close on the heels of the ghost.

Huge sand-filled egg timers and gigantic silicon chips whirled by as the wind howled and Klooge twirled along. "Nice effect, huh?" the ghost asked.

Klooge was wide-eyed with fright. "Where are we going?" he begged.

"We're going back to find out how you got to be such a great guy," the ghost said.

The Ghost of Systems Present

The Ghost of Systems Past

Before he could respond, Klooge and the ghost appeared in a glass-enclosed room, the air-conditioning turned up high. A group of programmers sat in rows behind a rotund, short, jolly-faced man in a white smock. The room was dominated by an IBM 7090 and a cluster of huge card-punch batch machines.

"Why, that's old Wizziwig, my first boss," Klooge cried out. "And that's me as an entry-level programmer. Wow, did I look like a nerd or what?"

"They can't see or hear us," the ghost explained.

Old Wizziwig stood and announced loudly to the room, "Come, my young technoids, it's Christmas Eve and you're already cross-eyed from too much programming. Let's have some eggnog and celebrate."

Young Klooge rushed over to Wizziwig breathlessly. "But Mr. Wizziwig, I've almost finished this piece of code. Another three hours and I'll have it."

"Lighten up, Klooge," Wizziwig laughed. "It's Christmas Eve, and even the accounting department is going home. It's time to enjoy the season."

Young Klooge was visibly disappointed but straggled along to the party. There, a pretty young woman — the data processing department secretary — came up to him. "Oh, Ebenezer — God that's a weird name — but hey, do you want to dance?"

"Sorry, Darlene, I'm totally consumed by this I/O problem, and dancing would just cause unwanted downtime," young Klooge replied.

"Jeeesh, what a geek," Darlene sighed and turned away.

Old Klooge turned to the ghost. "Please, I can't stand it. Take me away from here."

"Can't stand seeing yourself blow a chance at happiness, huh?" the ghost asked as he whisked Klooge into the night.

"Are you kidding? No. I can't stand to see a programmer wasting time at a party."

With that, the pair landed in a boardroom in a big city several years later. Three young businessmen were meeting. Klooge recognized them as former coworkers from Wizziwig's.

"Hey, it's Edson, Neidenfer and Baker," Klooge marveled. "Those guys started that billion-dollar software company. What are we doing here?"

"Just listen," the ghost said.

The three men were looking at a business plan. "So do we ask Klooge to join us?" Edson asked.

"I don't know," Baker said. "He's such a jerk."

"Yeah, forget about him," added Neidenfer. "He's a good programmer, but no one can stand him. He's so obnoxious."

"OK, he's out," Edson agreed. "Now let's talk about venture capital."

Klooge stood transfixed in horror. "Ooohhh, take me outta here. I couida had founder's stock, I couida been rich. Oh, that hurts. I get the picture."

Suddenly, Klooge found himself swirling forward through time, and then he landed in his bed. Before he could think about what had just happened, he fell into a deep sleep.

The sound of a loud dot matrix printer awakened him with a start. Another ghost was sitting at a terminal as stacks of green bar paper poured out of a nearby printer.

"Whatsit . . ." Klooge mumbled sleepily.

"It's just me, the Ghost of Systems Present," the apparition replied.

"Aw gee, and I was hoping it was John Sculley and Steve Jobs," an irritable Klooge retorted.

"Just my luck, a wise guy — and on Christmas Eve, yet," the ghost said, looking to the ceiling. "Why don't I get the good stuff, like *It's a Wonderful Life*, or *Miracle on 34th Street?* Oh well. Come with me, turkey."

With that, the ghost reached out and touched Klooge's collar and they were whisked off into the night.

They landed instantly outside a cottage in a run-down neighborhood.

The ghost took Klooge through a wall of the cottage into a tiny, bedraggled living room.

Inside, a fire glowed in the fireplace while a smiling woman sat in a rocking chair stringing popcorn for a scraggly Christmas tree. A threadbare rug covered the living room floor as three children lay on their stomachs watching reruns of *The Brady Bunch*.

"When will Dad and Micro Tim get home, Mom?" one child asked.

"Soon, I hope," the woman replied. "It's getting cold out there, and Micro Tim is so frail."

"My god," Klooge whispered. "This is Bob Batchit's house. What are we doing here?"

"You needn't whisper; they can't hear you," the ghost said.

The door to the house suddenly opened, and in walked Batchit with his young son perched on his shoulder. Batchit was crestfallen.

"Oh, Bob, is it bad news?" his wife asked.

"The memory upgrade cost too much," he responded.

The family gathered around the father and child. Tears rolled down their faces.

"Poor, poor Tim," they cried. "He's only got 128K on his PC. He'll never be a hacker now."

"It's OK, Dad. God bless us, one and all," said Micro Tim.

Klooge watched in horror. "Take me away from here, ghost," he implored. "If only I could help them out. I could have offered some of the free cycles on the mainframe for the poor kid."

With that, Klooge was whisked back to his bedroom. Shivering and irritated, he slipped under the covers, but he couldn't sleep.

"I wonder if Max Hopper has nights like this," he thought to himself.

Just as he was dozing off, Klooge heard a soft but pained moaning sound. He opened one eye and saw the third ghost reading the *Daily Racing Form*.

"Ooooh," the ghost moaned. "I can see the future, but I forgot to put $10 on Blue Moon in the sixth at Hialeah? How stupid can you get?"

"Let me guess — the Ghost of Systems Future?" Klooge suggested.

"You got it, ace. Let's put on those traveling shoes." And with that, Klooge was whisked off into the bleak night.

"Want to know the next big buzzword?" the ghost asked as they went.

"Not particularly," Klooge replied.

"Ok, fine, how about DEC's revenues for 1998?" the ghost countered.

"How about telling me if my capital expenditures are going up for the next five years so I can write a budget?" Klooge asked.

"No can do. The SEC keeps a close eye on stuff like that, you know."

Suddenly, the ghost and Klooge were plunked down in Bob Batchit's living room again. The family sat sadly around the dining-room table. No one spoke. Off in the corner, a dusty Tandy PC sat next to a tiny crutch.

The Ghost of Systems Future

Klooge stared in dismay. "Oh no. Not Micro Tim . . ." He looked at the ghost, who just looked away.

"Help me, ghost. Is this what shall be or what might be?" Klooge begged.

With that, Klooge was whisked off again. In a blink, they landed outside his office.

"What are we doing here?" he asked.

The ghost just nodded to three people in his office. One was going through Klooge's desk drawers, another was seated at his terminal, and a third was on his phone.

"Yeah, move Johnson's stuff in here this afternoon. We'll get rid of his junk this morning," the man said into the phone.

"So I hear the new guy is getting twice the salary," the first said. "Well, he'll easily deserve it if all he does is act civil to the staff. No one is crying over Attila the Hun."

Klooge looked wildly over to the ghost. "Hey, spirit, this is a joke, right? Come on, good one, you got me, ha ha ha. What a kidder."

The ghost simply shook his head and whisked the pair off to a downtrodden cemetery.

A cold wind blew across the bleak sky and a single bare tree stood pathetically above the mostly abandoned graves. A pair of mobile robots with shovels were just filling in a new grave.

"Wow, robot gravediggers, great idea," Klooge said to the ghost.

"Just listen," the ghost replied.

As the robots tamped down the final shovelfuls of dirt, one started to beep and buzz.

"Nobody showed up for this stiff," it announced.

"Manager said this one was a real loser," the other answered in a metallic, digitized voice.

"Let's get out of here," said the first. "This place depresses my architecture." With that, it stuck a small headstone in the dirt and they wheeled off.

The ghost pointed to the headstone, and Klooge, shivering and scared, got on his knees to get a closer look.

"Oh, no," he wailed as he cupped his face in his hands. "What a drag." On the headstone was one word:

KLOOGE

"Wow, I *was* hoping to retire to Miami Beach," Klooge said to the ghost.

With that, the ghost lifted his arms and Klooge zipped away back to his bed.

"Zowee," he yelled. "I'm back." He opened his window and leaned out. Down below was a young lad with his collar turned up against the cold.

"You, boy!" Klooge called. "What day is this?"

"Where are you from — Mongolia? It's Christmas!" the boy yelled back.

"What a nice boy, bright, spirited," Klooge said. "Listen, wise guy, I know it's Christmas. You don't know what kind of night I just had. Anyway, you know the Businessland store down on Grange? I want you to run down there and buy a PS/2 Model 50 with a laser printer and have it delivered to the Batchit house at this address. Buy a Nintendo game for yourself."

With that, Klooge dropped his Mastercard down to the boy. "How do you know I won't take off and charge a new BMW with this?" the boy called.

"Oh my good lad, it's Christmas! The world is beautiful, I'm happy to be alive. And besides, I'd find you and break your little arm. Now be off with you."

Klooge ran to his closet to dress. He hummed loudly to himself. "Oh, it feels so good to not be a jerk. I can't wait to get to Batchit's house and see the look on Micro Tim's face when he sees the new computer."

Klooge walked joyfully through the streets, wishing everyone a Merry Christmas. When he got to Batchit's cottage, he saw the delivery van pulling away.

The family leapt for joy when Klooge came in their house. Bob Batchit came up to him.

"Mr. Klooge, this is so generous, so unexpected. What . . ."

"Don't say anything, Batchit. Just enjoy it. I want that boy of yours to become a world-class hacker," Klooge said.

"I've turned over a new leaf," he bubbled on. "I'm going to order workstations for everyone in the company. I'm going to give up control of the network. I'm going to offer more applications to the end users. I'm going to DE-centralize."

"Wow, and are you going to admit that your five-year strategic IS plan was a flop?"

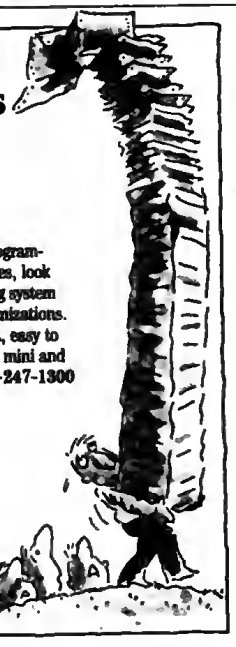
"Don't get carried away, Batchit. This 'good will' stuff only goes so far." ●

Field Service Management Systems

Putting one on-line takes over 100 man-years and 3 million lines of code.

Automating customer service can be a major programming challenge. So if you have enough challenges, look into FIELDWATCH™ software—the world's leading system for the support and management of service organizations.

FIELDWATCH software. It's flexible, efficient, easy to implement, and runs in a variety of mainframe, mini and micro environments. Call extension 580 at 800-247-1300 (617-272-4100 in Mass.).



FIELDWATCH

GROUP

The DATA Group Corporation
77 South Bedford Street
Burlington, MA 01803
West Coast Sales Office:
1750 Montgomery Street
San Francisco, CA 94111

A SERVICE Company

SOFT TALK

George Coleman

Normalizing not only way

In recent months, my name has been mentioned twice in this column regarding a study on data normalization that I conducted [CW, Oct. 17 and Nov. 28]. This leads me to address several points.

First, I certainly did not work alone on the normalization study. It was a joint effort with David Young of Amdahl in Sunnyvale, Calif., and others assisted as well. Furthermore, the normalization experiment was only one of several performance aspects of IBM's DB2 that we measured.

As to the issue of whether denormalization is good or bad, the truth is that almost all experienced mainframe database application developers recognize that normalization is not the last step in the process of database design.

If a database application does not perform at acceptable levels of response time, and if attempts at tuning it or "throwing hardware at it" fail to solve the problem, the application must be redesigned. This usually means — and this is especially true in on-line realization applications — that some data has to be denormalized.

In his column, Remon Lapid cited some excellent reasons that denormalization can cause problems; all the reasons concern changing data or the structure of data. But that does not mean that all physical data designs should be normalized. It does mean that decisions

Continued on page 64

IBM, DEC cut deal

DEC gives nod to IBM to supply 3480 drives

BY ROSEMARY HAMILTON
CW STAFF

Apparently, tape drives make strange bedfellows.

Digital Equipment Corp. and IBM recently signed a contract that will provide DEC with IBM 3480 tape drive products.

DEC said it will use the drives as the basis of a new tape subsystem. By using the IBM technology, DEC can provide customers with data interchange between DEC and IBM systems, the company said.

The IBM 3480 Magnetic Tape Subsystem is a standard tape cartridge product used in IBM mainframe shops. Other companies such as Storage Technology Corp. also supply mainframe users with 3480-compatible products.

According to a DEC spokesman, several DEC customers who also have IBM equipment have been requesting 3480-compatibility from DEC. Eventually, the DEC product would allow users to pull a tape cartridge from a DEC system and load it onto an IBM system, the spokesman said.

DEC provides a reel-to-reel tape drive subsystem for its high-end users but does not now offer a tape cartridge product.

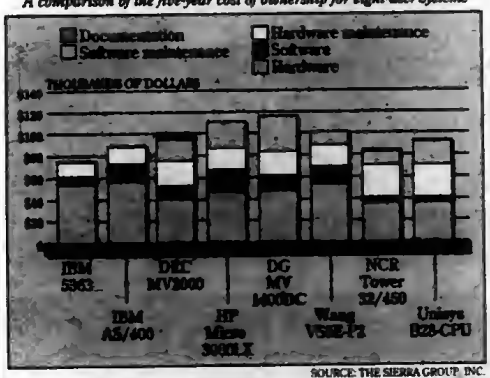
Neither company would reveal financial details of the agreement. The DEC spokesman said the deal is not an exclusive arrangement between IBM and DEC. While IBM is the only 3480 drive supplier that DEC is now working with, DEC has not ruled out working with other suppliers in the future, he added.

DEC would not say when its tape subsystem would be available. The spokesman said DEC will build all other components for the subsystem to work with the IBM drive.

Data View

What does your departmental system cost?

A comparison of the five-year cost of ownership for eight-user systems



SOURCE: THE SIERRA GROUP, INC.
CW CHART

Keeping an eye on all the important spots

BY JAMES DALY
CW STAFF

From a distance, the images resemble the impressionistic brushwork of a Degas or Cezanne. Splashes of reds tangle with blues. Greens and yellows pepper a brown field.

But move a little closer and the amorphous shapes slowly make an odd sense. Harbors, cornfields, houses — even the white line running down the center of an airport runway — appear like figures through a haze.

The bizarre and beautiful images are the result of satellite imaging using a remote-sensing application built around a Digital Equipment Corp. Vaxcluster system at the Spot Image Corp. At the nerve center of Spot's headquarters in Toulouse, France, are three VAX processors — an 8530, VAX-11/750 and 11/785 — and two DEC HSC50 storage controllers.

Every surface of the earth receives solar radiation that is either reflected or absorbed and emitted in specific wavelengths. These spectral signals are recorded by satellite-mounted high-resolution sensors sent up by Spot Image, with the DEC iron shaping the gathered information into photograph-like images.

Spot's remote sensing techniques have already hit it big in several areas. Geologists can interpret the subtle variations in color to discover depression patterns and aid exploration, city planners can use it to make maps that are more precise, and the military can get a high-flying view of the world's hot spots.

The process begins when data is garnered in "image swaths" that represent a section of the earth 60 kilometers wide and as much as 12,000 kilometers long, said Clark Nelson, director of corporate communications at Spot Image's U.S. subsidiary in Reston, Va.

Data is then transmitted from the satellite to one of several Decnet-linked receiving stations positioned around the world. After the datastream is recorded on high-density digital tapes (HDDT) at 50M bit/sec., the tapes are transported to another Spot Image facility for photoprocessing.

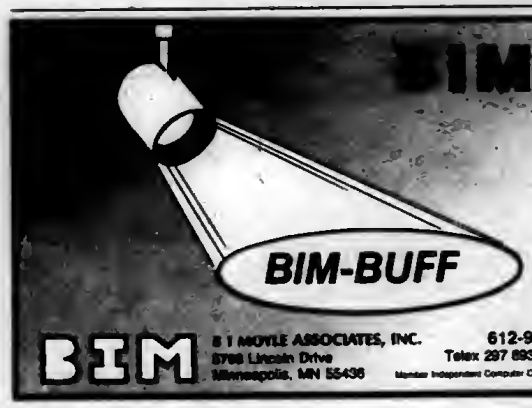
Spot Image *satellite scans the Earth*

When the firm receives a customer order, it reviews its catalog of HDDTs. If the image is not available, the satellite must be positioned to image the appropriate area.

If the imagery is already available on tape, the production process begins. The appropriate portion of the HDDT is located

Continued on page 64

BIM Spotlight



VSAM processing can be a breeze!

BIM-BUFF is a product which is designed to significantly increase the performance of VSAM in every DOS/VSE installation. It does this by dynamically managing VSAM buffers transparent to all programs, does not alter any VSAM files, and does not make any modifications to VSAM itself. While each installation is different, experience with some DOS/VSE installations has shown potential savings to be astounding. Using BIM-BUFF will result in reduction in VSAM jobs of physical I/O by up to 50%, CPU time up to 20% and elapsed time up to 60%.

Call for full documentation or free 30-day trial.

Price: $2400, $1200/yr, or $120/mo.

BIM
BIM MOYLE ASSOCIATES, INC.
5798 Lincoln Drive
Minneapolis, MN 55436
612-933-2885
Telex 297 693 (BIM UR)
Member Independent Computer Consultants Assn.

BIM has over 20 system software products for improving productivity and use of DOS/VSE, OS, and CICS, and also performs systems programming consulting. Marketing agents in most countries.

SOFT NOTES

Britton Lee seeking new identity

The name Britton Lee will take a low profile as part of a new marketing strategy being undertaken by the Los Gatos, Calif.-based vendor of database hardware and software.

Britton Lee, Inc. recently renamed its product line Sharebase and said the company will henceforth go by the trade name Sharebase From Britton Lee, Inc. The new business identity program is intended to stress the company's production-oriented SQL relational database management software as its principal product. The firm is renaming itself and its products to emphasize that it supplies both hardware and software, said President and CEO John Cavalier.

The International DB2 Users Group was founded recently in Chicago. Intended for DB2 users regardless of mainframe platform, the organization was created to provide a forum for exchanging ideas and experiences and increasing productivity for DB2 users internationally, the group said in a release.

The users group's 1989 conference chairman is Ken Paris of Peat, Marwick, Main & Co. in Montvale, N.J. The group's first international conference will be July 9-12 at the Hyatt Regency in Chicago.

As the Unix dice roll, Oracle Corp. is hedging its bets. The Belmont, Calif.-based vendor of DBMS software and services said it has joined both the Open Software Foundation (OSF) and Unix International, Inc. Unix International, once called the Archer Group, is led by AT&T and seeks to establish its Unix System V as a standard. OSF is building its environment around AIX, IBM's version of Unix.

Coleman

FROM PAGE 63

concerning denormalization must be made with care. Anyone who understands the data can create a normalized design; denormalizing data also requires an understanding of how it is used.

Relational database applications can perform well, but with today's technology, this can happen only when the number of blocks of data that any transaction accesses is controlled. This control may occur naturally with the process the transaction must perform — for example, display a specific record on the user's screen — or may occur in the table design, as when all tables are sufficiently small. Otherwise, the control must be artificially built into the application program or the table design.

Quite often in the mainframe environment, a normalized design does not perform well, even when the cache memory or buffer pool is increased or the speed of the processor is increased. The only choice then is to denormalize the data somewhere. As Lapid made clear, denormalization decisions usually involve trade-offs between flexibility and performance.

Such decisions are not always made easily. In fact, denormalization is really an extension of the art of normalization. Normalization requires an understanding of the data, but intelligent denormalization also requires an understanding of the flexibility requirements of the data; awareness of the update frequency of the data; and knowledge of how the database management system, the operating system and the hardware might work together to deliver optimal performance.

The simple truth is that denormalization is an economical and technological necessity; it must be seriously studied. A well-performing database cannot be designed strictly within the confines of relational theory. It can only be accomplished with an awareness of the total environment in which it must operate.

Coleman is a staff systems engineer for Amdahl Corp. in Chicago.

Eye on

FROM PAGE 63

and transferred at a rate of 400K bit/sec. to a VAX processor, where its contents are decoded. The raw information is then fine-tuned and enhanced to remove distortions caused by the earth's curvature.

Once corrected, the processor will store the output on either 1,600 or 6.25K bit/in. computer tapes; it is then directed to Vizir, a laser film writer from the French firm Sepimage, to produce photographic prints or transparencies.

The Vizir is also controlled by the Vaxcluster system, which instructs the film machine on how to translate digital information and render the image. The process takes about 10 minutes.

While the federal government accounted for nearly 70% of Spot Image's business in 1987, Nelson said that figure has been reversed so that seven of 10 sales came from the private sector in 1988. "It has ceased to be a highly specialized requirement," Nelson said.

AI system to monitor Southern Cal electricity

BY STANLEY GIBSON and AMY CORTESE
CW STAFF

Once the property of the academic and scientist, artificial intelligence was for many years a technology in search of a use. That is changing: Soon, everyperson who turns on an electric light in Los Angeles will depend on an expert system for their power.

Southern California Edison in Rosemead, Calif., one of the top five utilities in the U.S., is building an expert system to predict summer electrical consumption in the greater Los Angeles area.

The load forecaster is intended to anticipate maximum electrical consumption 24 hours in advance of use.

"That is important because you need the resources for the next day's load. Otherwise, you'll have a blackout or brownout," said Mark Samaha, an applications engineer at the utility who is working on the system. Samaha has been hard at work recording the wisdom of a human expert, around which he is building the system. If all goes well, the computerized expert will be lending its advice to the utility by this summer.

Copycats

Knowledge-based systems mimic human problem solving; rules are applied to data to reach a conclusion much the same way an expert would reason through a problem. An expert system typically consists of the knowledge base of stored expertise, an inference or reasoning engine that executes the rules and a human interface component through which the user accesses the system.

Samaha is using AI Corp.'s Knowledge Base Management Systems (KBMS) tools to create his application. KBMS is written in C and is intended for IBM mainframes. Southern California Edison will run its application on an IBM 3084 mainframe.

Samaha interviewed his expert, a senior system operations engineer, for a total of 16 hours and derived a total of 650 rules that govern the predicting of power needs. "The [human expert's] knowledge is at a very high premium. There are fewer than four or five individuals that could do his job. The job has demands unique to Southern California," said Samaha, explaining that an expert imported from New York would be sensitive to different variables and could not function as well.

Watching the heat

The summer weather is a major determinant of the region's power requirements, and rules are typically applied to weather information. In a rudimentary example, the expert looks at a weather report for the next 24 hours. If the prediction is for 95 degrees and high humidity, compared with 90 degrees with pleasant humidity levels today, then the area's power plants must produce a certain amount of additional electricity.

During the coming summer, both the human expert and the computer expert will be used in parallel and their predictions compared against actual needs. The results will be used to fine-tune the system, Samaha said. The $50,000 system should pay for itself after its first summer of use, he said.

▶ IBM 3270 and System 3X Users:

100% IBM 4224 Compatible!

▶Available Now!

With the plug-compatible ISI 7224, you can print everything an IBM 4224 can print and more.

Speeds reach 400 cps draft. You can also print graphics, bar codes, and oversize characters without GDDM, BGU, or other special software. Output can be in black or up to eight colors.

Fully integrated (no box!), the ISI 7224 connects directly to IBM 3174/3274/3276 controllers or S/3X twinaxial cable.

Forms-handling advantages include automatic paper parking, no-waste demand-document tear-off, and a straight path for stiff forms. No extra-cost gadgets are required.

Extra features and all, the ISI 7224 costs much less than its IBM counterpart.

For more information, call 1-800-544-4872 (in Michigan, 313/769-5900). Or write.

Interface Systems, Inc.
Printer Solutions for IBM Systems
5855 Interface Drive, Ann Arbor, MI 48103
Telex: 810-223-6058

▶ The ISI 7224 prints at 53.7 dBA — quieter than the IBM 4224. And since it's only seven inches tall, it fits tighter spaces.

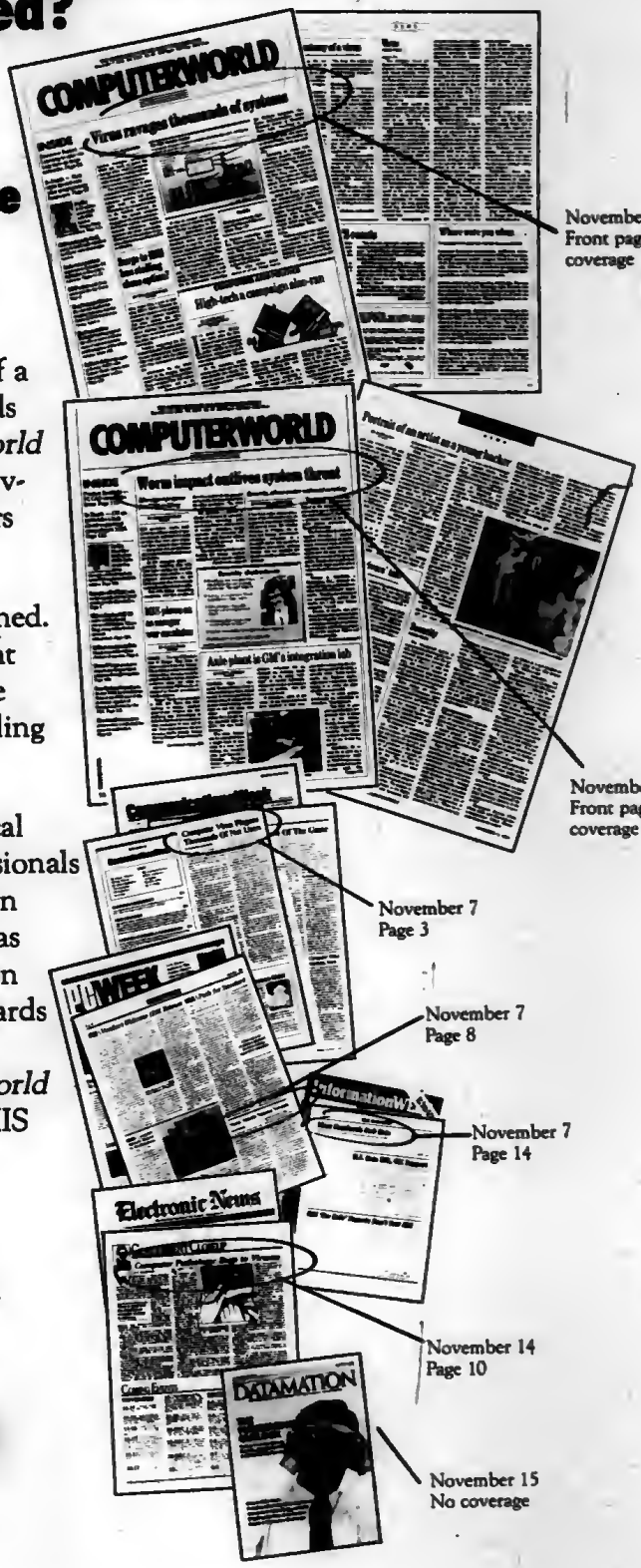
Which publication should you read for the most complete coverage of the news you need?

When the virus hit, only Computerworld gave you the whole story. When you needed it.

In the days that followed the attack of a computer virus that brought thousands of systems to their knees, *Computerworld* delivered the most immediate news coverage and in-depth follow up — others didn't even come close.

Computerworld told you what happened. How it happened. And how to prevent it from happening to you. You got the whole story. But only if you were reading *Computerworld.*

When it comes to delivering the critical news that information systems professionals demand, *Computerworld* is the proven leader. That's why *Computerworld* was named "Best Computer Newspaper" in the third annual Computer Press Awards Competition. And why independent studies consistently show *Computerworld* to be the publication most read by MIS decision makers.



November 7
Front page
coverage

November 14
Front page
coverage

November 7
Page 3

November 7
Page 8

November 7
Page 14

November 14
Page 10

November 15
No coverage

You decide. Every week.

COMPUTERWORLD

An IDG Communications Publication

The Terminal Of The '90s Has Arrived A Bit Early.

Wyse introduces the WY-150. They always said there would be such a terminal "someday". It would have the flexibility and connectivity to operate in virtually any computing environment, while meeting the most exacting ergonomic requirements. And, it would deliver those advantages at an affordable price.

"Someday" is here much sooner than expected.

Choose your favorite keyboard from three WY-150 options.

It's called the Wyse WY-150, a breakthrough in terminal technology that will set price/performance standards for years to come.

Bridging the worlds of ASCII, ANSI and PCs, the WY-150 offers compatibility with a wide range of operating systems. Including UNIX/XENIX, MS-DOS, Concurrent DOS, PC-MOS, and PICK. With a choice of three keyboards. And typical of Wyse, the WY-150 does it all with stylish design at a price that's also attractive.

The WY-150 also sets new ergonomic standards. Its 78 Hz refresh rate eliminates any hint of flicker. Just as overscanning and a bezel that matches the soft, paper white phosphor erase distracting borders. (Amber and green phosphors are also available.) The oversize 10x16 cell makes each crisp character stand out vividly.

The WY-150 is also part of *SystemWyse*. It links effortlessly with Wyse PCs and multi-user platforms to create uniquely integrated and cost-effective solutions. Everything is designed, manufactured, and tested by Wyse to work together. And it's all backed by the service and support of the world's leading independent terminal maker.*

Only one question remains. Now that the terminal of the '90s is here, what are you waiting for? Call today for more information on the WY-150.

1-800-GET-WYSE

Wyse* is a registered trademark of Wyse Technology. SystemWyse and WY-150 are trademarks of Wyse Technology. Other trademarks/owners: UNIX/American Telephone & Telegraph, Concurrent DOS/Digital Research Inc., PC-MOS/The Software Link, Inc., PICK/Pick Systems, MS-DOS, XENIX/Microsoft. *IDC 1988 U.S. Terminal Census.

WYSE

We make it better, or we just don't make it.

MICRO BITS

Douglas Barney

Waling on a Blue whale

Big Blue whale feast: IBM's Personal Computer strategy may be starting to work too well. Sick of getting trounced in the commodity-style PC price wars, the company fashioned a great plan. It got itself a new bus architecture and lost a whole lot of market share.

Like a pool hustler letting the bumpkins win for a while, IBM made its competitors over-confident. They thought the industry giant was done for as a major PC player. Their mistake was thinking that the rules and ruler of the PC game had changed. Meanwhile IBM, as the only Micro Channel supplier, was feverishly locking competitors out of its key accounts.

Then competitors made the bigger mistake of taking on IBM in public and then mimicking the IBM architecture with the Extended Industry Standard Architecture (EISA) bus. These folks didn't realize that you don't beat a market dominator with a slap in the face. Instead, you fall in line and do exactly what it does — except do it better.

Departing from IBM's PC

Continued on page 68

Flopticals: New PC backup?

Insite Peripherals creates a PC disk drive using optical technology

BY JULIE PITTA
CW STAFF

SANTA CLARA, Calif. — A flexible disk drive with a sprinkling of optical technology may one day replace tape drives as the backup method of choice for personal computers. With its relatively low expected retail price, the drive may eventually provide some PCs that do not have backup with an extra measure of protection.

Insite Peripherals, a start-up company located here, has created what Insite President and cofounder Jim Adkisson calls a "floptical" disk drive. To achieve higher track density, Insite inscribes a standard 3½-in. flexible disk with an optical servo track — a strip of optically recorded data.

The closed-loop optical servo guides the drive's read/write head so that it follows the magnetic data tracks more precisely than it does with standard floppy disks. The drive's read/write carriage is equipped with an LED and magnetic recording head.

The LED reads the track while the magnetic head reads the data. As a result, more data can be squeezed onto the Insite drive than on standard floppies, Adkisson said.

The Insite Model 1325 floptical disk drive boasts a track density of 1,250 tracks per inch, compared with 48 and 135 tracks per inch for traditional floppy drives.

More tracks, more bites

While a standard high-density 3½-in. floppy drive offers at best 1.44M bytes of storage capacity, the Insite drive offers 20.8M bytes, be added.

It may be quite some time before users see any Insite drives installed in a PC. Production will reportedly begin in the spring, and PC vendors will most likely wait before gambling on using such a product. The most likely source will be computer resellers.

The drive should sell to end users for less than $500, Adkisson said. A 40M-byte data cartridge drive sells for a price of about $300.

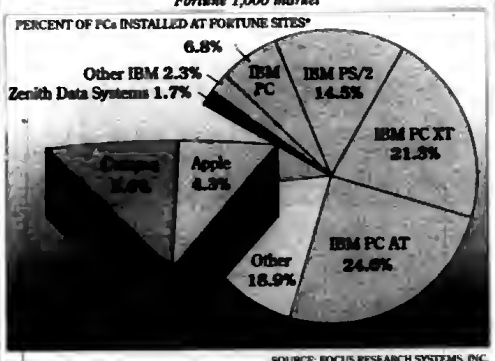
However, Insite is still "cleaning up some technical issues," Adkisson noted. He de-

Continued on page 68

Data View

Census says ...

Apple and Compaq share scraps in the IBM-dominated Fortune 1,000 market



SOURCE: FOCUS RESEARCH SYSTEMS, INC.
CW STAFF

Intex's Panorama lets you see the whole show

BY WILLIAM BRANDEL
CW STAFF

Spreadsheet users who want to see the cause and effect of their transactions can now use a product that gives them the whole picture.

Offered by Intex Solutions, Inc. in Needham, Mass., Panorama enables the viewer to pan a screen to observe all data movement and transactions as they occur.

The package also enlarges the viewing capacity on the screen to include zoom windows. The windows display the accounts that will be affected by the given spreadsheet transaction. Users can simultaneously see where their data block has gone and which account has been affected by any particular spreadsheet manipulation.

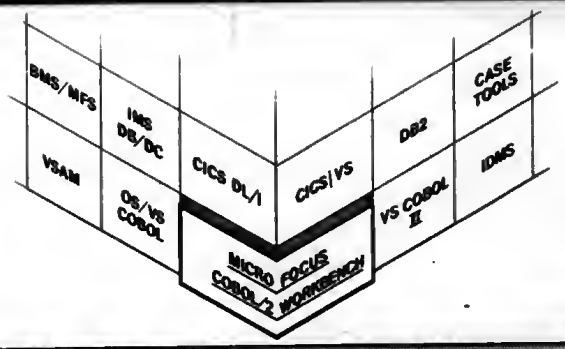
For example, if a 15% salary increase is given to an employee, the user can see how the increase directly influences cash flow, the balance sheet and anticipated annual income budgets in the zoom window while also viewing the 1-2-3 spreadsheet. Panorama also includes a mouse option.

The package includes its own driver and runs with IBM's Color Graphics Adapter, Enhanced Graphics Adapter, Video Graphics Array and Hercules Computer Technology, Inc. and Compaq Computer Corp. screens.

It is compatible with Lotus Development Corp.'s 1-2-3 Version 2.0 and higher and all versions of Lotus' Symphony.

The product is currently priced at $95 plus shipping but is scheduled to rise to $145 beginning in May.

Mainframe technology, but PC productivity. Now!



Micro Focus COBOL/2 Workbench™
The cornerstone of mainframe development productivity

Use Micro Focus COBOL/2 Workbench as the cornerstone of your application development strategy. The PC development environment based on COBOL/2 Workbench outperforms the host and provides programming, testing and debugging tools unavailable elsewhere. For the most efficient development of your mainframe applications using *any* of these technologies, call us now.

1-800-872-6265

Micro Focus, Inc.
2465 East Bayshore Road, Suite 400
Palo Alto, California 94303
United States
Tel:(415)856-4161

Micro Focus Europe, Ltd.
26 West Street
Newbury, Berkshire RG13 1JT
United Kingdom
Tel:(0635)32646

MICRO FOCUS®
A Better Way of Programming™

Barney

FROM PAGE 67

bus direction was a major blunder, but it may not be too late to return to the old ways of competing with IBM. It's simple. Let IBM set the standard (the Micro Channel) and then go see someone, such as Phoenix Technologies, that will help you legally duplicate it.

Next, kick the hell out of IBM with lower prices, more features and a friendlier approach. Meanwhile, keep the older stuff on the market and sell it cheap. Do it right, and users will love you while IBM learns to hate you.

Cloners should remember that IBM is still a big Blue whale. It's strong all right, but it doesn't turn so well. With the right strategy, a few PC sharks can easily slip underneath that Blue wad of blubber and do what cloners used to do — snack on IBM's entrails.

But cloners need sharper teeth, like cheaper Micro Channel machines, as well as an aggressive stance toward the future. Then we can all sit down and enjoy a nice meal at IBM's expense.

Tandy did it. Critics have been speculating that IBM's Micro Channel Architecture was impossible to fully clone and argue that so-called bus-mastering products would make the clones crumble. That has led to speculation that EISA was formed because cloners realized the Micro Channel was impossible to duplicate.

WITH THE right strategy, a few PC sharks can easily slip underneath that Blue wad of blubber and do what cloners used to do — snack on IBM's entrails.

That is apparently not the case with the Tandy 5000MC. Phoenix Technologies, which helps compatibles be compatible, has been testing the 5000 with bus-mastering products and reports that all's well that runs well. If Phoenix says the Micro Channel is clonable, then it is.

The straight story on Magellan. Lotus has never done well selling software that lists for less than $495, but it hasn't given up trying. Early next year, the company will announce and ship (now there's a novel idea) Magellan, a $149 package that provides users with a more intuitive way of searching through files for information.

With Magellan, users can enter a number of words that may be found in the file. After locating the right file, users can bring it up, along with the application, with one keystroke. Magellan also includes DOS shell capabilities, a macro language and tree-like directories.

Barney is a *Computerworld* senior editor, microcomputing.

Mainframe Muscle for your PC

SPF/PC™ 2.0

Now you can re-create the mainframe editing environment on your own IBM PC with SPF/PC, the only PC editor functionally equivalent to editing on the IBM mainframe with ISPF/PDF, Version 2, Release 2.

Files of virtually any size may be edited with SPF/PC because it uses all extended or expanded memory, or disk drive work space.

Mainframe users will especially appreciate SPF/PC's familiar commands, fast PC processing, and micro-to-mainframe file portability.

SPF/PC's main menu provides access to the EDIT and BROWSE facilities; utilities for file MOVE, COPY, RENAME, etc.; facilities to access other programs; on-line HELP and more.

Real work in progress on a COBOL file.

A few other SPF/PC enhancements:

- true split screen
- directory/member lists
- binary file editing
- picture strings
- hexadecimal editing
- 43-line EGA/50-line VGA support

SPF/PC runs under DOS on the IBM PC, XT, AT, PS/2 and all true compatibles; and in DOS emulation under OS/2. Native OS/2 support is in development.

Want proof? Ask us for a free interactive, demonstration diskette.

SPF/PC™ — so much like the real thing, you'll forget you're editing on a PC.

CTC®

Command Technology Corporation

1900 Mountain Boulevard, Oakland, California 94611 Telephone: (415) 339-3530 FAX:(415)339-3883

Flopticals

FROM PAGE 67

clined to offer specifics. Production is scheduled to begin in April, and the drive will be sold to OEMs and value-added resellers.

Although the technology may represent a breakthrough, it will be relatively inexpensive because it is based on standard media, Adkisson said. The drives will be sold to OEMs at a price of $250 in quantities of more than 5,000.

Adkisson said he expects initial orders to come from distributors and resellers in the add-in business. System vendors require that there be multiple sources of a product before committing to implement it, he maintained.

Insite is offering to license the technology to other drive makers. Adkisson said Insite is in serious negotiations with a number of parties. However, he declined to name them.

USERS may prefer Insite to a tape drive because it integrates well with smaller systems. Like traditional drives, the disk does not require specialized software to manipulate files.

Eastman Kodak Co. subsidiary Verbatim Corp. as well as Xidex Corp. have signed on to produce media, an important factor if other peripherals makers are to consider manufacturing the Insite drive.

Robert Katzive, a vice-president at market research firm Disk/Trend, Inc., said the new drive's sluggish performance will relegate it to a backup role.

However, users may prefer Insite to a tape drive because it integrates well with smaller systems. Like traditional drives, the disk does not require specialized software to manipulate files.

"Most people prefer disk technology because it's faster and much more familiar to them," he said. "With a tape, you have to run it all the way to the end to get to a certain file, and you need specialized software."

Insite's floptical disk drive offers an average access time of 65 msec, far slower than many rigid drives. The Insite drive will fill a gap, offering backup for the smaller 3½-in. rigid drives, Katzive noted.

AT&T grooms PBXs for data

Leverages ISDN support to push PC networking for its switches

BY ELISABETH HORWITT
CW STAFF

SANTA BARBARA, Calif. — While IBM has apparently cast off its Rolm Systems division PBXs from its ISDN and data networking strategies, AT&T recently laid out a strategy for providing data networking via its PBXs and ISDN.

The advent of Integrated Services Digital Network should boost the private branch exchange's credibility "as local arbiter of high-speed communication between PC and data center," said Thomas Nolle, president of Haddonfield, N.J., research firm CIMI Corp. PBX vendors have been unable to sell this idea in the past because PBXs were less effective than local-area networks for local communications and could not provide an effective long-distance data link, according to Nolle. Now however, PBXs provide 64K bit/sec. ISDN links to "someone at a remote site who is not on your LAN," he said.

At a meeting here with the AT&T Digital Multiplexed Interface/ISDN Users Group, an organization of computer and networking vendors, the vendor announced plans to publish an interface for writing ISDN data applications that would link IBM Personal Computers via its System 75 and 85 PBX systems.

Based on AT&T's Digital Communications Protocol (DCP), the interface is a focal point of the vendor's strategy to position its PBXs as links between PCs at a local site and ISDN wide-area networks, according to Roger Boyce, AT&T product manager of PC-PBX connections.

IBM PCs equipped with the DCP interface card can use the PBX to gain access to AT&T's Primary Rate ISDN service, which permits the user to "send files at 64K bit/sec. ISDN speeds from, say, here to Denver," Boyce said. Such a configuration is more cost-justifiable because the same PBX that handles PC data transfers can also be routing voice transmissions between sites over the same ISDN link, he added.

Fooling the applications

DCP is an existing AT&T interface for linking data equipment over the vendor's PBXs that supports the same 64K bit/sec. channels as ISDN. While DCP uses a different signaling protocol than ISDN, "applications don't see the difference," Boyce said.

AT&T sees the PBX-ISDN configuration as complementing rather than replacing LANs or dedicated mainframe-to-workstation links, Boyce said. "If you're doing distributed database applications, you probably won't use a PBX." But by providing PC users with a 64K bit/sec. ISDN link on demand, the PBX offers a cost-effective long-distance connection for sites that cannot cost-justify a dedicated connection or T1 multiplexer, he added.

AT&T plans to release the DCP specifications next spring to selected vendors with popular PC communications software packages, Boyce said.

The company said it hopes, for example, to gain DCP support from Hayes Microcomputer Products, Inc.'s AT modem protocol, IBM Netbios LAN products and Digital Communications Associates, Inc.'s micro-to-mainframe software, Boyce indicated.

IBM's apparent withdrawal from the PBX arena may give AT&T more room to sell its DCP concept to IBM installations.

Factories need to shed custom code

BY ELISABETH HORWITT
CW STAFF

High up on the wish lists of manufacturing information systems and plant floor managers are development tools and common application interfaces that minimize the need to write customized code for multivendor connectivity, according to a recent study by Advanced Manufacturing Research, Inc. (AMR).

The Cambridge, Mass., research firm interviewed managers from 150 Fortune 500 companies about how they were coping with factory floor communications and what they would like to see in the way of new developments and products.

Approximately 23% of respondents had installed some version of a Manufacturing Automation Protocol (MAP) network, AMR said. Most were in pilot sites with eight or fewer nodes, with applications split between intercell and real-time support.

A majority of users were still using proprietary networks, citing high costs, fear of pioneering and lack of vendor support as reasons for not going with MAP, AMR said.

The study found two distinct computing environments within manufacturing firms. Plant floor managers focused on real-time and process applications and on networking cells. Cells are groups of shop floor devices and controllers that work on the same process or product line.

Only 30% of respondents were experimenting with LANs for intracell communications;

Continued on page 70

Netwise to fashion tools for Netware

BY PATRICIA KEEFE
CW STAFF

Netwise, Inc. in Boulder, Colo., has agreed to provide Novell, Inc. with tools for developing applications for Novell's Netware LAN Server, according to a non-exclusive marketing and development agreement between the two companies.

The products, which Novell has agreed to market, will include Netware versions of Netwise's existing tools, which are said to facilitate the development of distributed applications by generating remote procedure calls (RPC). Netwise plans to develop other RPC products for specific Netware-supported environments and protocols. For example, support for Novell's SPX protocol in the DOS and OS/2 environments is scheduled for a first-quarter release.

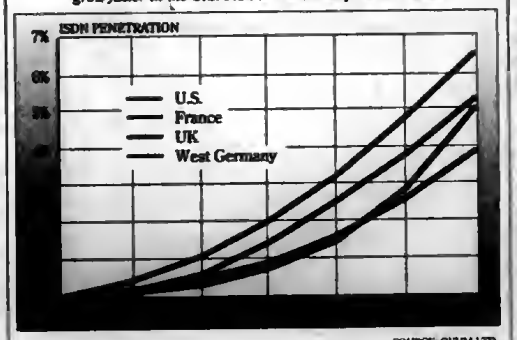
Similar support for Digital Equipment Corp.'s VMS is also planned, the vendor said.

RPC essentially supercedes Novell's much ballyhooed value-added processors (VAP). In an interview, Mark Caulkins, vice-president of Novell's software group, conceded that the VAP was difficult to use. The RPC will make it easier to write to Netware, but it still will not be as easy as writing to OS/2, he said.

Data View

ISDN at home and abroad

The telecom standard's rate of penetration into carrier networks should grow faster in the U.S. than in these European countries



SOURCE: OVUM LTD

Bells can soon send at 155M bit/sec.

BY ELISABETH HORWITT
CW STAFF

LIVINGSTON, N.J. — Bellcore has announced the successful completion of feasibility testing for a prototype technology that could enable Bell operating companies to provide transmission services at up to 155M bit/sec.

Switched Multimegabit Data Service (SMDS) is a proposed Bellcore public network-based service designed to extend local-area network and other high-speed local communications links over the local loop, the Bell operating company research and development subsidiary said.

If widely deployed by regional carriers, the technology could accelerate the growth of distributed processing applications, intercompany links such as electronic data interchange and LAN-to-LAN bridging, Bellcore said.

The organization has already demonstrated an SMDS prototype application for LAN-to-LAN bridging.

By providing standardized high-speed switched services, SMDS technology would address the needs of large corporate users who find the current 64K bit/sec. version of ISDN "vastly inadequate in terms of bandwidth," according to Kenneth Phillips, chairman of the committee of Corporate Telecommunications Users.

First services

SMDS services are likely to be the first offerings made by the Bell operating companies that support the broadband Integrated Services Digital Network, according to Glenn Estes, a district manager at Bellcore. Broadband ISDN is a still-embryonic version of the telecommunications standard that could support up to 200M bit/sec.

"ISDN typically defines interfaces and protocols" for a wide range of transmissions, including voice, data and video, Estes said. In contrast, SMDS fully defines a data-only service.

In the interim period before broadband ISDN becomes a usable standard, SMDS services are likely to deploy other technologies, such as the ANSI-based 802.6 standard for metropolitan-area networking, Estes said.

By offering such speeds over a switched network shared by multiple customers, the Bell operating companies will save users money when sending over dedicated high-speed lines, Bellcore said.

SMDS services could be deployed within local public networks within the next two to four years, depending on availability of network equipment, Bellcore said.

Bellcore would not provide a date for its release of SMDS specifications to vendors for implementation in communications equipment. Nor would it reveal which, if any, of the Bell operating companies are currently contemplating the announcement of SDMS-based services.

BIT BLAST

GE and GM subsidiary to set up overseas EDI links

GE Information Services will be working with **General Motors Corp.** subsidiary **Electronic Data Systems Corp.** to set up electronic data interchange (EDI) links between General Motors and its suppliers in Europe.

Documents such as invoices and delivery schedules will be exchanged between GM and its suppliers by means of GE Information Systems' EDI Express software and services.

The GE subsidiary will also provide EDI consulting to EDS. The EDI network will facilitate GM's move to just-in-time manufacturing in Europe, as well as eliminate paperwork, postal delays and human input errors, the companies said.

Telematics International, Inc. has announced a long-term agreement to supply its Net 25 family of packet-switching systems to **NCR Comten, Inc.**, a wholly owned subsidiary of **NCR Corp.**

NCR plans to market the products worldwide and to use them in its internal data network, NCR Worldwide Internal Network.

Tellabs, Inc.'s network management system will form the basis of user configuration and management features within **Bellsouth Corp.**'s Flexserv family of services, the two organizations said.

Tellabs' Telemark system will reportedly allow users to consolidate or reroute dedicated digital circuits within Bellsouth's operating companies' T1 connections.

Digital Communications Associates, Inc. has begun shipping FT/Express, a software product said to provide file transfer at rates up to 12 times faster than the vendor's existing Irmalink product.

The software runs with DCA's Irma family of micro-to-mainframe boards and is available in either an IBM CMS or TSO version for a fee of $9,000 per CPU, the vendor said.

The **IEEE 802.3 Committee** has established a study group to investigate standards that can be applied to network hub devices such as star hubs, multiport repeaters and wiring concentrators.

Co-hosted by vendors **Interlan, Inc.** and **BICC Data Networks, Inc.**, the group will hold its first meeting in Orlando, Fla., February 1-3.

Factory nets

CONTINUED FROM PAGE 69

the rest used some kind of point-to-point proprietary link between devices within a cell.

The MIS group focused on linking cell controllers, general-purpose computers and terminals onto a backbone network. Materials flow was typically handled by cell controllers communicating with one another as peers and also with a general-purpose host for overall coordination, respondents said.

While 77% of the respondents supported multivendor computing standard Open Systems Interconnect (OSI), more than 60% of the respondents had established a primary host computing platform, typically based on IBM, Hewlett-Packard Co. or Digital Equipment Corp. systems, AMR said.

Users look to the vendor

The conclusion was that while users looked to OSI for eventual multivendor connectivity, they expected their primary vendor to help them migrate to the standard.

IS departments at advanced companies are "looking beyond communications and . . . seeking a common application environment providing a common user interface, database access and programming interface," which would run across a variety of computing and networking systems, AMR said.

Such a platform could eventually make networking protocol issues obsolete, by allowing the user to access computing resources without worrying about what type of system or network they are on, AMR said.

NEW DESIGN TOOL!

SpecWriter™

Now you can design micro, mini and mainframe system components utilizing:

- Screen Painting
- Screen Prototyping
- Report Painting
- Report Prototyping
- Layout Development
- Word Processing

And, create complete Functional Specifications. This is the innovative, non-procedural PC product. Supports VSAM, IMS screens and reports, IDCAMS and 3270 types. 30-Day Money-Back Guarantee!

ORDER TODAY OR CALL FOR FREE DEMO DISK

TOLL FREE 1-800-641-3671

1-619-560-1414

MANAGEMENT

TAKING CHARGE

Robert A. Zawacki

A downsizing checklist

Assemble 35 human resources executives from information systems organizations and you're sure to get a free-flowing discussion about how to handle a variety of challenges.

That certainly was the case in a recent symposium that I co-sponsored in which such a group of IS human resources experts shared their experiences and opinions. The common concerns that emerged related to topics such as downsizing, innovative reward systems, mentoring, strategic human resources planning, customer service, performance appraisal, innovation and the question of hiring IS majors or general business majors from colleges.

In addition, there was general agreement on a string of recommendations relating to one key topic — downsizing — with which many participants had recent experience.

Their checklist for downsizing in IS includes many items:

- If you plan to cut 30%, cut at least 35% so you can get the unrest behind the organization and move forward. Always make your first cut deep enough to prevent future unanticipated cuts. A management team probably cannot survive two cuts — its credibility will

Continued on page 72

Stripping down IS

Playboy pares systems after 50% budget cuts

BY J. A. SAVAGE
CW STAFF

In his company's heyday, Playboy Enterprises, Inc. data processing director John Close was rolling in money to spend on new technology. Close built up a multinational system to run everything from gaming operations in the Caribbean to the company's own credit card transaction system.

After 20 years with Playboy, Close is now in charge of tearing down the systems he built. He says he is not sad about the demise of the centralized data center. Instead, he hopes downsizing will provide new business opportunities for the company.

"In the late 1960s and early 1970s, we were trying to find ways to deal with the money. We couldn't make decisions that didn't work. We were trying to stay in the lead with technology, but it wasn't so much of a planning process as a reactive process," Close says. "As the social aspects of the country changed, the magazine had less of an impact on the way the country thought. That's when the decline started."

After suffering a 50% cut in budget in the last five years, Close decided the only way to help the company survive in the long run was to dismantle his mainframe shop. He expects to finish the job and have applications running on minicomputers and personal computers and in service bureaus by spring. The host IBM 4341 system will be gone.

Close is undecided about his personal plans after the phase-out is complete.

Running an empire

Close built the systems to handle all of Playboy's computer needs. There were limousine services, modeling agencies, Playboy Clubs and casinos, resorts, the Playboy cable channel and, of course, *Playboy* magazine.

"For example," Close says, "for the modeling agency, we provide models throughout the world, with each transaction handled through an IBM 3270-type terminal — everything from accounting to scheduling, access to external databases, making airline reservations, spreadsheets, development packages — that kind of thing. *Playboy* magazine uses the system primarily for accounting and financial services."

The Boulder, Colo., IS operation serviced international operations as well as corporate offices in Chicago, Los Angeles and New York, each of which have representatives from all of Playboy's businesses. These offices also are serviced in-house by PCs and one mid-range system in Chicago.

Close's position in the hierarchy indicates the importance Playboy puts on information systems: He reports to the chief financial officer, who in turn reports to the chief executive officer. For decades, that CEO position was held by Hugh Hefner, whom Close calls "Hef," and was recently turned over to Hefner's daughter Christie, who has been the company's chief operating officer since 1984.

The party's over

Playboy is run as a business, Close insists. "At least, that's always been the attempt," he adds. Close says that when he started, the company was more into the party scene, "but in the early 1970s, we began to see that change."

Since the early 1980s, the company has sold off most of its assets, such as the Playboy Clubs and resorts. In cutting costs, MIS cannot be eliminated, but Close says it has been squeezed more than other areas. "As you're trying to make sink-or-swim decisions for the company, MIS gets to the point where it can get squeezed more than anything else, particularly as those decisions become less dependent

Continued on page 72

PROFILE

John Close

Position: *Data processing director, Playboy Enterprises, Inc.*
Mission: *To downsize Playboy's MIS operation because of the company's financial cutbacks.*

Data View

Hot spot

*As technical analyst positions gain popularity, they will also experience greater salary growth**

Operations analyst	$33.4	6.2%
Scheduler	$27.2	6.1%
Telecommunications analyst	$31.1	6.1%
Data processing operations manager	$48.9	5.2%
Maintenance programmer	$33.1	5.3%

* Based on a survey of more than 400 medium-size and large data centers nationwide
SOURCE: INTERNATIONAL ASSOCIATION FOR COMPUTER OPERATIONS MANAGEMENT
CW CHART

New Hancock IS chief looks at big picture

BY JAMES CONNOLLY
CW STAFF

BOSTON — Now that the budget process and staff performance reviews are out of the way, Diane Smigel can focus on her long-range plans.

Smigel spent much of her first two months as vice-president of information services at John Hancock Mutual Life Insurance Co. working on the "excruciating" annual budget and review processes. But she also has found time — often at home — to make plans for 1989.

Smigel, with 20 years of IS-related experience in the insurance industry, was promoted in October to John Hancock's top IS job. Formerly a second vice-president in charge of planning and support services, she replaced Edward J. Boudreau Jr., who became president of the firm's mutual fund subsidiary.

Taking work home

"Focusing on the big picture on a daily basis is a challenge. This is a big, busy place. One of the challenges every day is to rise above the meeting syndrome and concentrate on where we want to go in the long run," Smigel said. "I do a lot of my thinking at home so that I can be accessible during the day, and I do a lot of it after my family has gone to bed."

When asked what she hopes to accomplish, Smigel quickly mentions continuing efforts launched by Boudreau during his two-year tenure. One goal is the strengthening of what she said are good relationships among the central IS group and the application developers working in John Hancock's business units. Boudreau drove decentralization of the development process by assigning 500 programmers and analysts to the business units.

The 450 employees in Smigel's central IS group run the data centers and networks and support functions such as an information center and IS training.

She will be focusing much of her efforts on expanding training programs — particularly in cross-training programmers and analysts and educating senior IS managers — and building a better technical architecture. The latter, she said, involves improved communications among IBM mainframes, Digital Equipment Corp. minicomputers and Wang Laboratories, Inc. office systems as well as standardization of databases. In addition, it means "sunsetting" some products that are not considered strategic and encouraging the use of new technologies such as image processing and expert systems in practical applications.

Hancock's Smigel

Smigel joined John Hancock in 1987 after working as a consultant for Arthur D. Little, Inc. and in IS at The New England and Capital Holding Corp.

CALENDAR

JAN 8 14

Enterprise T-1 Networks: Emerging Strategies. Washington, D.C., Jan. 9-10 — Contact: Telecom Publishing Group, Attn: Conference Registrar, P.O. Box 1455, Alexandria, Va. 22313.

Automated Clearinghouse Services in Government Seminar. Arlington, Va., Jan. 11 — Contact: NACHA, Suite 640, 1901 L St. N.W., Washington, D.C. 20036.

JAN 15 21

National Retail Merchants Association Annual Convention and Business & Equipment Exposition. New York, N.Y., Jan. 15-18 — Contact: NRMA, 100 W. 31st St., New York, N.Y. 10001.

PTC '89, Conference of the Pacific Telecommunications Council. Honolulu, Jan. 15-18 — Contact: Pacific Telecommunications Council, Suite 308, 1132 University Ave., Honolulu, Hawaii 96826.

Computer Graphics New York. New York, Jan. 17-19 — Contact: Exhibition Marketing & Management Co., Suite 1110, 8300 Greensboro Drive, McLean, Va. 22102.

Supercomputing Solutions '89: New Technologies for Super Performance Computing. New York, Jan. 17-19 — Contact: Supercomputing Solutions '89, Suite 1110, 8300 Greensboro Drive, McLean, Va. 22102.

Executive Conference for Corporate Data Processing Managers. New York, Jan. 18 — Contact: International Data Corp., Box 955, 5 Speen St., Framingham, Mass. 01701.

Zawacki

FROM PAGE 71

be shot.

- If you are going to cut 35%, make the cuts at all levels, including the direct reports to the IS director. In every IS organization I have been in, a complete level of middle management could have been eliminated with the organization actually becoming more effective. We will see very flat IS organizations in the future.
- Before you cut, define your core technology people. These are people you must have to move forward after the cut. Consider giving these employees bonuses or else the best among them will leave.
- Consider downsizing your management ranks as an opportunity to evaluate your managers. Although it is painful, most IS organizations believe the net effect of this action is healthy because it forces decisions that should have been made months or years ago. Use performance tools and supplement them with a rating form that evaluates managers on their competencies and skills.
- When you are evaluating individual contributors, consider their motivation in addition to their skills, aptitude, experience and past performance. Take care to remember that programmers can have all the skill in the world, but they will still not be capable of producing up to their potential if they are not motivated.
- Evaluate the cut list for the impact on protected classes of people.
- Communicate decisions as soon as possible. This must be done face to face by the immediate manager. The grapevine will already have alerted people to strange activities in the organization, and people will have a fairly good feel for the downsizing. Remember, research indicates the grapevine is 80% accurate.
- Have a system established to out-process the people who are cut. If resources permit, provide assistance with placement counseling.
- Evaluate your management development program. After downsizing, management must send a positive message that this is the team for the future. Then there should be a training program that reinforces that message.

Zawacki is president of Zawacki & Associates, an information systems consulting firm in Colorado Springs.

Stripping

FROM PAGE 71

on information and more dependent on trying to save the organization."

At its peak, the MIS department employed 80 people. Now it is down to less than half that. Close says that most applications were developed in-house until the early 1980s. He adds, "Now most of the applications have been acquired from OEM people." In the new environment, Close says, there will be minimum development, just typical maintenance operations and interface with outside software developers.

The host mainframe in Boulder will be eliminated, and the site will be shuttered. "Large applications, ones that are too large for our proposed direction, will go off-site into a service-bureau-type environment, using the base that we've already built on VM. We're going to draw upon a System/38 Model 700 in the Chicago office to do limited processing — a lot of the batch work. Our PCs will do the very small operations that we plan to move over," Close says.

The first office to get new treatment will be in Los Angeles. At this point, Close is identifying applications that are too large to run in-house. He says, "We take those things that can be done locally on minis and micros."

Close says he is limiting applications going to a service bureau to only the "pieces with heavy CPU demand, which are very intricate in the way they're written."

Los Angeles will be a pilot site this spring, Close says, because of its cable television production capacity. "Since that is an intense database-driven kind of operation, we want to support it in the same manner they've been accustomed to." Los Angeles will be a learning experience for Close, and, he says, "That process can be applied to any new applications" in other offices.

Downsizing will have its costs, Close admits. He hopes to offset much of it by selling equipment, but he does not expect to reap much from the resale value. "We'll be lucky to break even," he says. Close hopes to cut the cost of Playboy's IS by 25%.

Despite the preponderance of *Playboy* magazines mixed in with computer publications in his office and the fact that he gets to call the former CEO by his nickname, Close maintains that Playboy is a business like any other, and IS can still be a key to its continued survival.

"DYL-280 II's DB2 Interface enables us to do mixed mode processing and report generation in one easy step."

"DYL-280 II's DB2 Interface enables us to do mixed mode processing and report generation in one easy step. QMF is fine for straight report writing, but we want to be able to read and update a DB2 table using a flat file, and then produce a report simultaneously. This can't be done with QMF, and the other alternative is to use Cobol. DYL is far simpler to use and much faster. Another feature we like is the way DYL handles the return code.

We're using the DB2 interface more and more, both as a programmer's tool and as an end user's tool. Everyone is very pleased with the way the product has performed for us."

Ms. Jean Mulcahey
Advisory Programmer Analyst*
MONUMENTAL LIFE INSURANCE

STERLING SOFTWARE
Dylakor Division
The company that cares about its customers and its products.
9340 Owensmouth Ave., P.O. Box 2210
Chatsworth, California 91313-2210

DYL-280 II is the information management system for IBM mainframes. Free-form, English-syntax software that consistently delivers reliable results and complete accessibility to IMS, DL1, DB2*, IDMS† and IDMS/R† DBMS plus full SQL/DS* support.

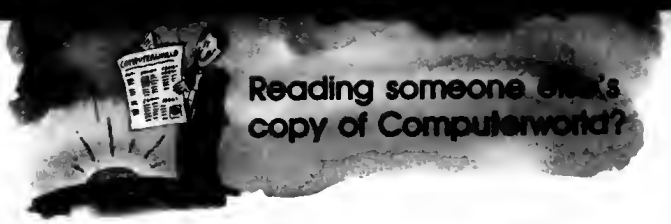
With over 20,000 users worldwide, DYL-280 II continues to provide professional support to today's MIS professionals.

For more details on the DYL-280 II information management system, please call Sterling Software, Dylakor Division at 818-718-8877.

ADe015

*DB2 and SQL are trademarks of IBM Corp

†IDMS and IDMS/R are trademarks of Cullinet Software Inc



YES, I want to receive my own copy of COMPUTERWORLD. Please send me 51 weekly issues for only $39.00* — just 76¢ per copy. In addition, I'll receive FREE bonus issues of COMPUTERWORLD FOCUS.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48

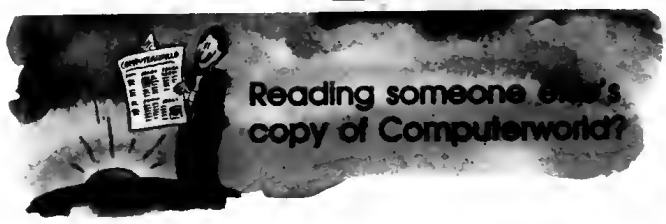
* U.S. Only. Canada $110, Central/South America $135, Europe $195 (Airmail), all other countries $295 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. BUSINESS/INDUSTRY (Circle one)
   10. Manufacturer (other than computer)
   20. Finance/Insurance/Real Estate
   30. Medicine/Law/Education
   40. Wholesale/Retail/Trade
   50. Business Service (except DP)
   60. Government — State/Federal/Local
   70. Communications Systems/Public Utilities/Transportation
   80. Mining/Construction/Petroleum/Refining/Agric.
   90. Manufacturer of Computers, Computer-Related Systems or Peripherals
   99. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   00. Computer/Peripheral Dealer/Distributor/Retailer
   76. User, Other _____
   99. Vendor, Other _____ (Please specify)
2. TITLE/FUNCTION (Circle one)
   IS/MIS/DP MANAGEMENT
   10. Vice President, Asst. VP
   21. Dir., Mgr., Supvr., IS/MIS/DP Services
   23. Dir., Mgr., Supvr., of Operations, Planning, Adm. Services
   23. Dir., Mgr., Supvr., Analyst, of Systems
   31. Dir., Mgr., Supvr., of Programming
   33. Programmer, Methods Analyst
   35. Dir., Mgr., Supvr., OA/WP
   39. Data Comm., Network/Systems Mgr
   OTHER COMPANY MANAGEMENT
   11. President, Owner/Partner, General Mgr
   12. Vice President/Asst. VP
   13. Treasurer, Controller, Financial Officer
   41. Engineering, Scientific, R&D, Tech. Mgr
   51. Sales/Mktg. Mgr
   OTHER PROFESSIONALS
   20. Consulting Mgr
   70. Medical, Legal, Accounting Mgr
   00. Educators, Journalists, Librarians, Students
   99. Others _____ (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
   A. Mainframes/Supermins
   B. Minicomputers/Small Business Computers
   C. Microcomputers/Desktops
   D. Communications Systems
   E. Office Automation Systems
   F. No Computer Involvement

E4901-0



YES, I want to receive my own copy of COMPUTERWORLD. Please send me 51 weekly issues for only $39.00* — just 76¢ per copy. In addition, I'll receive FREE bonus issues of COMPUTERWORLD FOCUS.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Basic Rate: $48

* U.S. Only. Canada $110, Central/South America $135, Europe $195 (Airmail), all other countries $295 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. BUSINESS/INDUSTRY (Circle one)
   10. Manufacturer (other than computer)
   20. Finance/Insurance/Real Estate
   30. Medicine/Law/Education
   40. Wholesale/Retail/Trade
   50. Business Service (except DP)
   60. Government — State/Federal/Local
   70. Communications Systems/Public Utilities/Transportation
   80. Mining/Construction/Petroleum/Refining/Agric.
   90. Manufacturer of Computers, Computer-Related Systems or Peripherals
   99. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   00. Computer/Peripheral Dealer/Distributor/Retailer
   76. User, Other _____
   99. Vendor, Other _____ (Please specify)
2. TITLE/FUNCTION (Circle one)
   IS/MIS/DP MANAGEMENT
   10. Vice President, Asst. VP
   21. Dir., Mgr., Supvr., IS/MIS/DP Services
   23. Dir., Mgr., Supvr., of Operations, Planning, Adm. Services
   23. Dir., Mgr., Supvr., Analyst, of Systems
   31. Dir., Mgr., Supvr., of Programming
   33. Programmer, Methods Analyst
   35. Dir., Mgr., Supvr., OA/WP
   39. Data Comm., Network/Systems Mgr
   OTHER COMPANY MANAGEMENT
   11. President, Owner/Partner, General Mgr
   12. Vice President/Asst. VP
   13. Treasurer, Controller, Financial Officer
   41. Engineering, Scientific, R&D, Tech. Mgr
   51. Sales/Mktg. Mgr
   OTHER PROFESSIONALS
   20. Consulting Mgr
   70. Medical, Legal, Accounting Mgr
   00. Educators, Journalists, Librarians, Students
   99. Others _____ (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
   A. Mainframes/Supermins
   B. Minicomputers/Small Business Computers
   C. Microcomputers/Desktops
   D. Communications Systems
   E. Office Automation Systems
   F. No Computer Involvement

E4901-0

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

The industry year in lists

Nineteen eighty-eight. Leap year, Olympic year, election year. It's all over now, except for the shouting — and the list-making. As we do every year, we'll skip the 10 Best Movies and 10 Worst-Dressed Women and Men compendiums and concentrate on what we humbly purport to know best.

The 10 Biggest Stories of 1988:

1. The standards wars. The Open Software Foundation vs. Unix International — nee Archer group — and the Extended Industry Standard Architecture vs. the Micro Channel.

2. The IBM Application System/400 — nee Silverlake.

3. Computer Associates reaching the $1 billion revenue plateau by acquiring Applied Data Research — and CA's rebuffed attempt to swallow Management Science America (MSA).

4. The saga of Prime Computer — from the hunter of Computervision and Calma to the hunted of MAI Basic Four. In a year of unwanted suitors such as CA, Daisy Systems and Telxon, MAI's Prime pursuit proved the most significant.

5. Apple's "look-and-feel" suit against Microsoft and Hewlett-Packard.

6. The struggle of mini makers such as Data General and Prime against the accelerating trend of MIS buyers to powerful PCs and local-area networks.

7. The creation of IBM United States under Terry Lautenbach. IBM's flattening of its organization and pushing of decision making out to its business units mirrors the organizational trend being practiced by many of its largest customers.

8. The dynamic random-access memory shortage.

9. The woes of Lotus — missed shipping dates, executive departures and a falling stock price.

10. The minisupercomputer industry shakeout.

11. (Last-minute addition.) The merger of Morino Associates and Duquesne Systems.

Continued on page 74

Postal Service cries uncle

Scraps sweetheart contract with Perot because of legal protests by EDS

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. Postal Service has given up on its controversial computer services deal with Perot Systems Corp. because of legal protests filed by archrival Electronic Data Systems Corp. (EDS).

Postmaster General Anthony M. Frank announced Dec. 16 that the Postal Service and Perot have agreed to terminate the contract, albeit reluctantly. In a statement, Frank said, "The contract has been tied up so badly by protests and lawsuits that we have lost much of the original opportunity.

"The studies we had hoped to complete last August cannot now be done before next February and could well be further delayed by active litigation," namely ongoing lawsuits between Perot and EDS, Frank said.

H. Ross Perot

A recent court order [CW, Oct. 24] sought by EDS limits Perot Systems to nonprofit work through Dec. 1, 1989, and effectively killed the deal, the postmaster general indicated.

EDS and Perot are involved in a bitter feud dating back to December 1986, when EDS founder H. Ross Perot left EDS and its parent General Motors Corp. EDS argues that Perot is violating a severance agreement stating that he would not compete with EDS for three years.

Perot Systems, based in Vienna, Va., issued a statement that supported Frank's decision, adding that "efforts to make major changes in a large organization inevitably energize forces opposed to change."

Splashy reentry

The Postal Service contract was signed in May as part of Perot's splashy reentry into the computer services market. The two-part contract allowed Perot's new company to study methods of improving postal operations and then implement the ideas under a shared-savings contract.

But the unusual arrangement triggered howls of protest from competitors and members of Congress because it was not open to competitive bidding and seemed to lock Perot Systems into a 10-year sweetheart deal with the agency.

EDS and McLean, Va.-based computer services firm Planning Research Corp. each filed official protests with the General Services Administration's Board of Contract Appeals.

Not revenge

The EDS protest came after several top EDS executives defected to work for Perot Systems, but EDS denied that its protest was sparked by any revenge motives.

Jack Biddle, president of the Computer & Communications Industry Association, praised the decision to scrap the contract.

He said the action preserves the government's policy of open competition and avoids the financial conflict of interest that occurs when a company involved in "problem identification" also provides the hardware and software solutions.

European unity to alter PC sales strategies

BY AMIEL KORNEL
IDG NEWS SERVICE

PARIS — The European Community's plans to abolish internal trade barriers in 1992 are forcing personal computer suppliers to modify their production and distribution strategies.

"Europe is still a very fragmented marketplace," said Brigitte Morel, managing director of Dataquest/Intelligent Electronics. "But we all know that in the next 10 years, we will have to sell to this market in a very unified fashion."

In that time, the Western European market will undergo sweeping deregulation of export laws, customs oversight and even currency differences among nations. The changes pose vast challenges for all companies selling goods and services in Europe but may prove particularly vexing for vendors in the fast-growing but intensely competitive personal computer market.

Morel and other speakers at a Dataquest/Intelligent Electronics conference here last month stressed that PC manufacturers must develop distribution channels that can irrigate all of Europe and offer greater added value — in the form of services, training and support — to professional users.

PC suppliers are also being forced to reexamine their production strategies in light of the European Community plans, lest they find themselves locked out of what will become the world's largest PC market, according to Dataquest/Intelligent Electronics. Many already have begun shifting manufacturing to local plants.

'Attic assembly'

More than 50% of the PCs shipped in Europe during the past two years were made in Europe, according to Dataquest/Intelligent Electronics researcher Kees Dobbelaar. Most imports came from Southeast Asia, not from the U.S. or Japan. Even these imports are starting to be challenged by what Dobbelaar called "attic assembly," by small local firms importing components from Asia.

IBM accounted for 31.3% of the production volume in Europe in 1988, according to Dataquest/Intelligent Electronic's preliminary figures. It was followed by Ing C. Olivetti & Co. at 15.6%, which manufactures its PCs near corporate headquarters in Ivrea, Italy; Apple Computer, Inc. at 9.6%, which has a facility in Cork, Ireland; and Hewlett-Packard Co. at 5.5%, which has doubled production this year at its plant in Grenoble, France.

Compaq Computer Corp., which this year accounted for only 3.7% of European production, recently built a plant in Scotland.

Shoring up local identity

Other non-European firms are expected to reinforce their European manufacturing presence in order to shore up their local identity and avoid the potential protectionist fallout of the European Community plans.

With user demands becoming more sophisticated, it is increasingly difficult for PC dealers to maintain profitability, said Michel Aguerreberry, managing director of Agena SA, a major French distributor. He predicted the European dealer network will grow only 5% annually during the next five years.

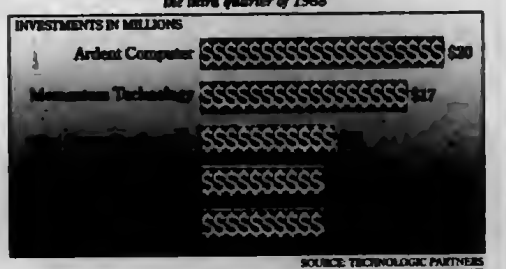
"The expected market growth will lead to a bottleneck," he said, "if manufacturers don't change their attitudes toward distribution channels." He said this means manufacturers must reduce their reliance on direct sales and form closer partnerships with large distributors and value-added resellers.

Paul Helminger, vice-chairman of Computerland Europe S.A., agreed. "The best partnership strategy is the one which adapts best to the variety of local market situations while at the same time taking advantage of the [overall] European dimension business is moving into," he said.

Data View

Venture capital: What's hot

Largest computer industry venture investments during the third quarter of 1988



SOURCE: TECHNOLOGIC PARTNERS
CW CHART

Wilder

CONTINUED FROM PAGE 73

Comebacks in 1988:
- John Cullinane, Cullinet.
- Gene Amdahl, Andor.
- H. Ross Perot, Perot Systems.
- Steve Jobs, Next.
- Bill McGowan, MCI Communications.
- Ed Cherney, Encore International.
- Bill Poduska, Stellar.
- Allen Michels, Ardent.
- Ken Oshman, Echelon.

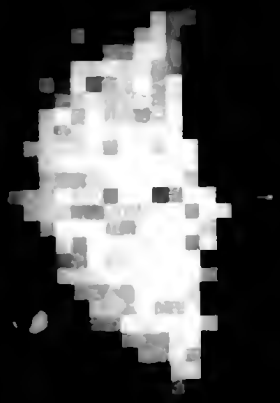
Moving up in 1988:
- Terry Lautenbach, IBM.
- George Conrades (again), IBM.
- James Cannavino, IBM.
- Frank King, Lotus.
- Bob Weiler and John Landry, Cullinet.
- Allen Loren, Apple.
- Anthony Craig, Prime.
- Curtis Hessler, James Unruh, Unisys.
- Larry Perlman, CDC.
- Dennis Vohs, Ross Systems.
- Robert Allen, Robert Kavner, AT&T.
- Gil Williamson, NCR.

Moving out in 1988:
- Bill Lowe, IBM.
- Joe Henson, Prime.
- Jerome Meyer, Honeywell Bull.
- Allen Krowe, IBM.
- Kaspar Cassani, IBM.
- David Chapman and George Tamke, Cullinet.
- Bill Graves, MSA.
- The Lotus departures — Chuck Digate, Irfan Salim, Mike Kolowich, Palmer True, and John Shagoury, among others.
- Roy Folk, Ashton-Tate.
- Peter Appleton-Jones, Etrsi.
- Norbert Berg, CDC.
- Thomas Roberts, CDC.
- Jan Lindelow, Unisys.
- Del Yocam, Apple.
- Debi Coleman, Apple.
- Stu Miller, Lynn Pearce, Software AG.

Casualties in 1988:
- Saxpy Computer.
- Celerity Computing.
- Cydrome.
- Scientific Computer Systems.
- Ramtek.
- Rise Technology.

Wilder is Computerworld's senior editor, computer industry.

A new PDU —
no easier
connectability
under the sun.



International
Power
Machines

Paradyne woes end with $250M sellout to AT&T

BY NELL MARGOLIS
CW STAFF

Paradyne Corp.'a long and rocky road back from legal scandal and financial disaster took a sharp turn last week when AT&T agreed to acquire the beleaguered data communications equipment maker for approximately $250 million, or $10.25 per share.

Analysts, who expected a bid for Paradyne — a frequent entry on lists of probable acquisition targets — but voiced surprise that the bidder turned out to be AT&T, viewed Paradyne'a sales and service strength as fueling the offer. "Paradyne has a fairly sizable sales force, and their distribution channel and service organization are considered quite good," said Theodore Moreau, an analyst at Robert W. Baird & Co. in Milwaukee. Services, said Moreau, accounted for approximately 20% of Paradyne'a 1987 revenue of $233 million.

Paradyne'a "international distribution, sales and service are of great interest to us," an AT&T spokeswoman confirmed.

Paradyne'a large installed base and Largo, Fla., plant also received mention as attractive to AT&T. "I think that [AT&T is] desperate to improve its market reach into data networking and realistic about its ability to do it through internal development," said Maria Lewis, an analyst at Shearson Lehman Hutton, Inc.

Lewis dismissed as public relations spin AT&T'a contention that the Paradyne acquisition will also bring AT&T "some manufacturing and development expertise that they don't already have." However, she and others expect the communications giant to employ a balance rather than a hatchet when it comes to evaluating the companies' respective product lines.

Derailed in '85

Given Paradyne'a history, said Andrew Schopick, an analyst at Gartner Group, Inc. subsidiary Soundview Financial Group, the AT&T offer is a coup for the Florida-based company. Once regarded as a promising communications contender, Paradyne was derailed by a 1985 indictment for fraud in connection with a purportedly rigged government systems bid.

The organization'a 1987 settlement with the U.S. Department of Justice dismissed all charges other than conspiracy, to which the company pleaded guilty; however, four years of harrowing legal combat depleted both its morale and financial resources — legal bills alone were estimated at approximately $18 million, according to a company spokesman.

Moreover, further legal woes and the need to triage outdated technology and unprofitable product lines mired Paradyne in further staggering expenses.

Under the terms of the proposed acquisition, AT&T will hold Paradyne as a subsidiary; the company will remain at its Largo site, under the direction of current Chief Executive Officer John Mitcham, who was brought in from IBM last summer to help turn Paradyne around.

MARKETPLACE

1988 year for bargain shoppers

This year promises more of same, as vendors are expected to unveil products

BY THOMAS J. DONOVAN
IDC FINANCIAL SERVICES CORP.

During 1988, used equipment prices experienced a dramatic decline for a number of computer products. For the owners of equipment — both data processing users and equity investors — this drop may require a write-down of their portfolios. However, for purchasers of used equipment, the marketplace presents particularly attractive values.

IBM equipment ranging from 4381 processors to 3380 disk drives to 3800 laser printers fell victim to these declines. Retail prices for the 4381 Model P13, for example, fell from January prices of 58% to November prices of 32% of IBM list price.

Bargain hunters will also find savings in the storage marketplace. In January, a head-of-string 3380 AA4 with one 3380 B4 was trading retail for about $31,100. By November, the retail price for the same equipment was only $10,700. This represents a decline of 66%. IBM 3800-3 laser printer prices also fell 32% in that time.

Even alternative vendors' equipment was not spared from suffering through substantial declines in used prices. The Wang Laboratories, Inc. VA-65 processor dropped from 57% of list price in the beginning of the year to current prices of 30%, while the Digital Equipment Corp. VAX 8600 fell from 70% to 43% over the same time span.

Some of these declines can be attributed to the normal life cycle of computer products and the impact of replacement technology, while other declines are more difficult to explain. The drops in the IBM direct-access storage device (DASD) products mentioned above can be accounted for by the shipment of higher capacity 3380 K drives, falling prices of older 3380 D and E drives and increased plug-compatible manufacturer competition.

On the other hand, the 4381's demise was caused more by IBM's upgrade pricing and a general lack of end-user demand.

Predictions

What can we expect in 1989? IDC Financial Services Corp. said that IBM will be making major product announcements in both DASD and medium- and small-scale 370 processor families. In the first half of 1989, IBM is expected to announce the replacement for the 3380, called the 3390; the replacement for the aging 4381 family of processors, dubbed the 4391; and additional models of the Enterprise System/9370.

DEC, Wang and several other computer manufacturers are also expected to make significant announcements in 1989.

As these new products displace the prior generation, supply of used equipment will increase. This increased supply will, in turn, create downward pressure on secondary market prices.

What posture should MIS directors take under these circumstances? Purchasing new equipment from the manufacturer without regard to secondary market activities and potential future announcements can deplete corporate funds unnecessarily. As a result, MIS departments may be left without the capital to purchase or lease additional equipment when significant new announcements are made. Given the bargains on the secondary market and the projected announcements of replacement products, it is difficult to understand why anyone would purchase new equipment from the vendor at list price.

Astute MIS directors should consider the purchase of used equipment or short-term leases to fill interim needs and conserve funds for purchase or long-term lease of future products.

For MIS directors with limited budgets, the new year will present a significant opportunity to bring their data centers up to almost leading-edge technology at very reasonable expenditure levels. Those directors may want to consider IBM 3090 processor base models, Amdahl 5890 processors and National Advanced Systems XL processors for their high-end needs, all of which are projected to trade for less than 50% of list price by the end of 1989. Significant opportunities will also exist for DASD and cartridge tape and a whole range of other computer products.

For more information, contact IDC Financial Services' Terri LeBlanc at 508-872-8200.

1988 hardware marketplace

Product	Current list	Used price first-quarter 1988	Used price fourth-quarter 1988
IBM3090 Model 200 (64x32)	$4,585,970	$3,348,000	$2,752,000
Amdahl 5890 Model 300E (64x32)	$4,000,000	Not trading	$2,520,000
IBM 3081KX (32x24)	$2,680,731	$563,000	$348,500
IBM 4381 Model P13	$447,731	$260,000	$143,000
DEC VAX 8600	$469,875	$329,000	$202,000
Wang VS-65	$35,200	$20,000	$10,500

SOURCE: IDC FINANCIAL SERVICES, INC.
CW CHART

Index

Marketplace 75
Used/Lease/Rent 75
Hardware 80
Software 80
Peripherals/Supplies 80
Graphics/Desk Top Publishing 80
Time/Services 79
Bids/Proposals/Real Estate 80
Business Opportunities 80
Training 81

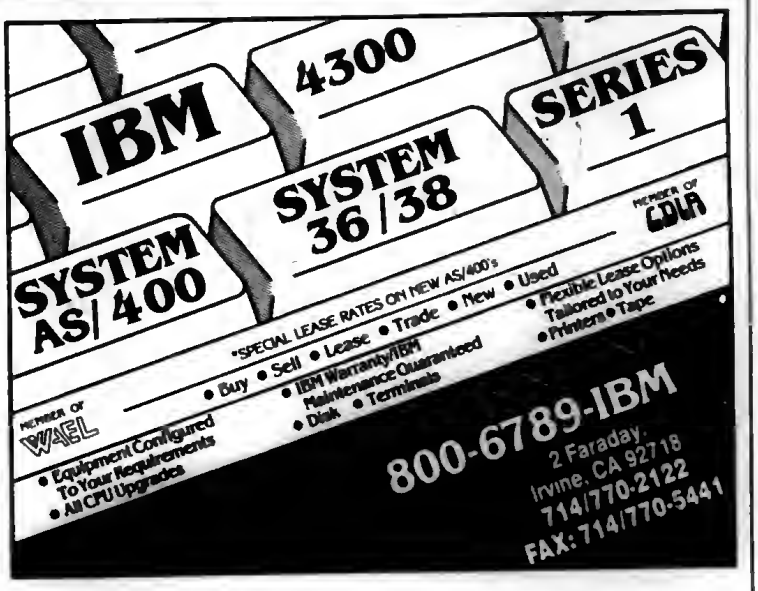
The BoCoEx index on used computers

Closing prices report for the week ending Dec. 16, 1988

	Closing price	Recent high	Recent low
IBM PC Model 078	$750	$900	$400
XT Model 086	$1,125	$1,250	$900
XT Model 089	$1,350	$1,575	$1,050
AT Model 099	$1,875	$2,400	$1,700
AT Model 239	$1,925	$2,900	$1,800
AT Model 339	$2,250	$3,600	$2,425
PS/2 Model 30	$1,650	$1,700	$1,300
PS/2 Model 50	$2,500	$2,600	$1,900
Compaq Portable I	$725	$975	$600
Portable II	$1,825	$2,000	$1,650
Portable III	$2,600	$3,650	$2,500
Portable 286	$1,750	$2,400	$1,675
Plus	$1,100	$1,250	$800
Deskpro 286	$2,375	$3,150	$1,800
Deskpro 386	$4,000	$5,100	$3,800
Apple Macintosh 512	$650	$950	$550
512E	$850	$1,025	$600
Plus	$1,125	$1,325	$950
II	$4,200	$5,100	$3,800
Toshiba T3100	$2,500	$2,500	$2,000
Toshiba T5100	$4,300	$4,700	$3,850

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Used/Lease/Rent



Used/Lease/Rent

Before You Reach the End of Your Line . . . Call ICS

- Upgrades
- Processors AS400, 36, 38, 43XX
- Peripheral Equipment

In California
(714) 838-3717
Call:
(800) 258-2233

HP 3000

ATP's • S/70
7937H • 7933H

Available in Quantity

Processors • Peripherals
Systems

All In Stock - Immediate Delivery

All warranted to qualify for manufacturer's maintenance

BUY • SELL • TRADE
RENT • LEASE

ConAm Corporation
It's Performance That Counts!
800/643-4954 213/829-2277

IBM BUY · SELL · LEASE

SYSTEM 36/38
43XX 30XX
AS/400
AT&T VOICE SYSTEMS
SERIES 1

- Processors
- Peripherals
- Upgrades

JETTESEL & ASSOCIATES INC

(800) 888-2000

FOR SALE OR LEASE

ALL IBM EQUIPMENT INCLUDING

3380-AD4, BD4, AE4, BE4, 3725-1
3480-A22, B22, 3880-3, J23, G23

AVAILABLE NOW

BACK FINANCIAL CORPORATION

2380 Congress Avenue, Clearwater, Florida 34621
(800) 456-5170 (813) 785-2500 FAX #(813) 786-8303

DEC PDP-11

SYSTEMS & PERIPHERALS

BUY SELL

THE One-Stop EXCHANGE!

- CPUS • TERMINALS
- DISC DRIVES • PRINTERS
- INTERFACES, ETC

DIGITAL COMPUTER EXCHANGE INC

Call (415) 887-3100

Reconditioned digital™ Equipment

Whatever your requirements are for Digital Equipment, call CSI *first!* Buying, selling, trading, leasing, consignments - we do it all!

CSI sells all equipment with a 30 day unconditional guarantee on parts and labor and is *eligible for DEC maintenance.*

Offering systems, disk drives, tape drives, printers, terminals, memory, options, boards, upgrades and many more.

CSI Computer Systems, Inc.
76 Teaco Dr. Stoughton, MA 02072
CALL TOLL-FREE 1-800-[illegible]
In Mass. (617) 344-[illegible]
FAX (617) 344-[illegible]

WANT TO BUY

3720'S • 3725'S

FOR SALE

3720's • 3725's • 3745's

DDC Communication Controller Specialists

Distinctive Dataprocessing Consultants, Inc.

Call us for a quote on your features, upgrades, and line sets!
(214) 869-2214
FAX 214-869-1589

HEWLETT · PACKARD

1000 • 3000 • 9000

Computers • Peripherals
Terminals

Buy • Sell • Rent • Lease

EURODATA INC.
2574 Sheffield Road
Ottawa Canada K1B 3V7
613-745-0921
FAX 613-745-1172

NEW IBM 9370

9375 Central processor [illegible]
(4) 9336 disk drives (8) - 3 gigabytes
(2) 9336 disk controllers (A)
(2) [illegible] racks (CPU and disk)
[illegible] printer - laser LPM
(5) 3270 terminal model planar
(24) 3151 CRT terminals
(2) 3420 tape drives
3803 tape controller

Under IBM Maintenance
Available Immediately
(404) [illegible]

SELLING A DATA CENTER?

Call Bencom it's our Specialty

Highest Prices Paid - Fast & Professional

- Systems PC's to Mainframes - All Brands
- CRT's and Printers - All Brands
- Communications Equipment - All Brands
- Cabling, Flooring and Cooling Systems
- One or Multiple Locations

January Special - Codex LSI 48FP $195. Substation Switch $75. Dial Backup $75. 8250 $250. 4803 Switches

BENCOM MARKETING 308 El Norte Parkway Escondido, CA 92025

IBM Unit Record Equipment

Data Modules/Disk Packs
Magnetic Tape/Diskettes

029-082-083-084-085-088
129-514-519-548-557-188

2316-3336(1)&(11)-3340(70)
80-200-300 MB
Disk Packs

Thomas Computer Corp.
[illegible] W. Howard Chicago IL [illegible]
800-621-[illegible] 312-647-[illegible]

Your Used computer equipment deserves a second chance.

If you have used computer equipment to sell, *Computerworld*'s product classified Marketplace is the best place to do your selling. That's because the C'-ed-fied Marketplace features a Used/Lease/Rent section to help you market your equipment to the very people who are looking to buy.

And when you advertise in *Computerworld* Classified Marketplace, you reach a total (ABC-audited) audience of over 612,000 computer professionals who turn to *Computerworld* for news, information, features - and the Classified Marketplace - every week.

So give your used computer equipment a second chance today. Call 800/343-6474 (in MA, 508/879-0700) to reserve your space.

Used/Lease/Rent

HONEYWELL

LEVEL 6 DPS 6 SERIES 1+

- Complete Minicomputer [illegible] New & Used
- All Peripherals and Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance Guaranteed
- Immediate Delivery Low Prices
- HDS 5 and HDS 7 Compatible Terminals

The Recognized Leader Honeywell Minicomputer Sales and Support

BCS

BOUDREAU COMPUTER SERVICES
[illegible] Bearfoot Road
Northboro, MA [illegible]
508 393 6834
FAX 508 [illegible]

3745 Available

****

Centron DPL is one of the first suppliers with early delivery positions on the 3745-210 and 410 models.

We can provide delivery on the 210 now with aggressive lease rates and we can assist you with your planning.

We offer:

- Flexible lease terms
- Upgrade/Downgrade provisions
- 410 or upgrade available in 4th qtr
- Early delivery on expansion frames
- Configuration assistance

Centron DPL Company

Offices Nationwide

Phone: 612/829-2800
Toll Free: 800/532-7532

CDLA
AEL

BUY OR SELL NEW OR USED

IBM PC * XT * AT * PS/2
COMPAQ * HP * AT&T * WANG
MACINTOSH * APPLE 2

1-800-262-6399

Boston Computer Exchange Corporation
MA 617-542-4414
FAX 617-542-8849

BUY, SELL LEASE IBM CPU's

3081's, 3083's, 3084-QXX, 3090
PILLAR SILENT BLOCK, PARALLEL CABINET

GTEX Financial Group
(214) 783-1212

CDLA Est. 1978

PRIME

EXPERIENCED SYSTEMS AND PERIPHERALS

BUY-SELL-LEASE-BROKERAGE

NEW PLUG-COMPATIBLE DISK, TAPE, MEMORY

PLUS
THE FASTEST I/O AVAILABLE ANYWHERE

1ST SOLUTIONS, INC
11460 N CAVE CREEK ROAD
PHOENIX, AZ 85020
602-997-4997
ASK FOR DON SHIFRIS

We buy, sell, lease & rent quality new and used equipment. And we stand behind it for a year.

digital

SA482-AA (New) 2.488GB Storage Array $52,000.00	Printronix P500 (600LPM) $1,995.00 LQP03 w/sheet feeder $395.00 LA100-PC $500.00	RA81-AA 456 Winchester Disk Drive $6,500.00
M8880-CA 8MB Memory For MVII $2,995.00	MICROVAX II Configured to your needs CALL...	Long and Short Term Leases and Rentals Available CALL...
RA82-AA 622MB Winchester Disk Drive $13,500.00	Wanted Sun Microsystem Computer equipment, any system, any configuration	We pay Cash for New, Used and Obsolete Surplus DEC Equipment

TRIDEX CORPORATION
Phone: 603-886-0383
Fax: 603-886-0914
375A WEST HOLLIS ST. NASHUA, NH 03061

PROCESSOR POWER

Do You Need...

- ★ 42-74 Mips of IBM Compatible Power
- ★ 40% Less $ than IBM
- ★ 12-36 month financing
- ★ NOW

Call Major Computer Incorporated
(612) 933-6000

AS/400

$/38 $/36

Upgrades - Features
Displays - Printers

GENICOM PRINTERS
Twinax - Coax
Faster than IBM - - 40% Less Cost

QUICK DELIVERY
BEST PRICE
TOLL-FREE HOTLINE
LeasePak International
1-800-532-7725

NOW MORE THAN EVER YOU NEED TO KNOW THE REAL IBM® VALUES

COMPUTER PRICE GUIDE®

Since 1978 - The Authoritive Source For Price & Market Information For Used IBM Computer Equipment - Published Quarterly @ $48.00 Per Year.

TO SUBSCRIBE CALL TOLL-FREE 800-537-6398

SALES EXPERTS AVAILABLE FOR IMMEDIATE QUOTES

COMPUTER MERCHANTS
THIRD PARTY SPECIALISTS IN IBM EQUIPMENT
200 BRADY AVE. • HAWTHORNE, NY 10532

(914) 769-2866
FAX
(914) 769-4867

DEC VAX & AT&T

BUY-SELL-NEW-USED

Systems, Peripherals, Options available for sale

Looking to purchase VAX and AT&T Systems, Hardware

LAKEWOOD COMPUTER CORP.
[illegible] Lisa Lane
Ft. Collins, CO 80524
(303) 493-9405 FAX:(303) 493-9400

dda

We Buy & Sell DEC

Systems
Components

Digital Computer Resale

call:713 445-0062

600 Kenrick Ste C22
Houston, Tx 77060

Used/Lease/Rent

CALL US LAST

GET YOUR BEST PRICE
Then Call
SPECTRA PRODUCTS, INC.
For The Best DEAL
WE
Buy - Sell - Lease - Rent
IBM and DEC SYSTEMS
NEW and USED
Other Services Available
Installation and Maintenance
Contract Programming

Call 800-238-8405
IN TN 901-754-8500

SPECTRA PRODUCTS, INC.
1669 KIRBY PKWY. MEMPHIS, TN 38119
"SINCE 1974"
Formerly Computer Brokers, Inc.

CAD STATION $9,995

The Tektronix 4125 Color Graphics Terminal

Reconditioned Products: Our demo and lease returns are restored to latest specifications and are available with a variety of options.
These products carry Tek's full warranty.

For purchasing or leasing information, call
1-800-TEK-6100

Tektronix

GWD-117

We Buy, Sell & Lease IBM Processors and Peripheral Equipment

DASD
3380 3375
3370 9335
Immediate Delivery

CPU's
9370 4381
4341 4361
Sale/Lease

Tape Drives
3480 3430
3420 3422
Immediate Delivery

Display Stations
3178 3279
3179 3279
3180 3191
Immediate Delivery

Controllers
3880 3803 3725
3274 3174 3705
Immediate Delivery

Printers
4245 4248 3800
3800 3820 4214
Immediate Delivery

Computer Marketing Inc.
PO BOX 0, MARGATE, NJ 08402-0430
609/823-6000
Contact/Bernie Gest
Telex: 5106012293
Established 1969

NORTHEAST MINICOMPUTER, INC.
55 High Street, Unit 6
Billerica, MA 01862

Wants to Buy Your Surplus DEC Computer Equipment

We Pay Cash for Your Unwanted Computer, Peripherals, Options, Memory, and Terminals.

Call 1-800-343-8302
or in Mass.
1-800-663-2600.
Or Fax Your List
1-800-657-0715

Turn Your excess Inventory into Cash $$$$

dda NMI

RT
937X
Series/1
AS/400
System 36, 38
4300

Buy, Sell, Lease, Rent

612•942-9630

All IBM Machines and Parts

DATATREND
10250 Valley View Road
Suite 149
Eden Prairie, Minnesota 55344

Partial Listing

Systems
MV 20000 MOD1
MV 20000 MOD2
MV 10000 MOD2
MV 10000 8MB
MV 6000-4 8MB
MV 6000 8000 Series
MV 7800 4MB
MV 4000 DC Loaded
MV 4000 2MB
S-140 HPP, SMC
Desktop All Mode

System Upgrades
MV20000 Mod 1 to Mod 2
MV10000 Mod 8 to Mod 20
MV10000 Mod 10 to Mod 20

DATA GENERAL — Call for Prices

Memories/Options
MV20000 4,8,16,32 MB
MV10000 4,8,16,32 MB
MV10000 2,4,8 MB
MV6000 2MB
S-140 256KB
DESKTOP (All Sizes)
IBC - 2
IAC - 16
IAC - 8

Terminals
D200
D211
D215
D410
D460

Peripherals
6161 S/S 147MB
6160 S/S 72MB
6214 S/S 600MB
6061 S/S 158MB
6122 S/S 277MB
6323 120MB
6236 S/S 354MB
6237 S/S 1.0GB
6230 S/S 600MB
6135 Streamer
6085 S/S 800/1600 BPI
6300 1600/6250 BPI
4374 1200 LPM
4573 600 LPM
4327 300 LPM

International Computing Systems
Box 343 Hopkins, MN 55343
(612) 935-6112 FAX (612) 935-6664

WANTED: DEAD OR ALIVE - All DG Systems

Do Something to Help Others and Help Yourself in Return

The National Vitiligo Foundation needs your help. In return we have something of value for you. Donate your un-needed Computer equipment to the foundation and receive its full value on a tax write off. The foundation in turn will sell the equipment for badly needed funds to help those afflicted with this incurable disease. Complete proof of what the equipment is worth will be sent to you in writing. You help us and we help you. Best of all, those who have Vitiligo will be given hope. Help us help others and help yourself in return. Call today!

Call Collect 617-764-1900

NATIONAL VITILIGO FOUNDATION, INC.
Stoughton, MA 02067

WANG

Buy-Sell or Trade

VS PC MVP OIS

Systems in Inventory
VS 7100 / 100 / 85 / 65 / 5 / 5

And Peripherals
4236A • 4236 • LPS-5 • 2200C
PC/AT "WORKSTATIONS

Genesis Equipment Marketing

Phone (602) 277-8220
Fax (602) 224-0613

* AT is a registered trademark of I.B.M.

VAX RENTALS

MV 3500/3600
MICROVAX II
VAX 6000 SERIES
VAX 8000 SERIES
Systems & Peripherals

- Fast Turnaround
- Dependable Products
- Upgrade/Add-On Flexibility

6 Months • 12 Months • 36 Months

BROOKVALE ASSOCIATES
dba Digital Desktop Association

IBM SPECIALISTS

SELL • LEASE • BUY
S/34 S/36 S/38 AS/400
S/1

COMPUTER MARKETING

PO BOX 71 • 610 BRYAN STREET • OLD HICKORY, TENNESSEE 37138

AS/400 S/38 S/36 S/34 SERIES 1

BUY - SELL
LEASE

Systems, Peripherals
Upgrades

Source Data Products Inc.
966C Industrial Road
San Carlos, CA 94070
1-800-333-2966
415/595-7791

WANT TO BUY

- Data General
- Fujitsu
- Data Products
- CDC
- Printronix
- Zetasco

(617) 862-6664
FAX: (617) 871-4466

Get Into the Market...
Computerworld's Product Classified
MARKETPLACE
Reach Over 812,000 Information Systems Professionals!
Call for all the details
(201) 967-1358
(508) 620-7759
(508) 620-7784
(508) 620 7758

IBM
BUY • SELL • LEASE

PARTS
S/36 S/38
S/1 POS
AS/400
BANKING

AMCOM CORPORATION
800-328-7723
612-829-7445
5555 WEST 78TH STREET
MINNEAPOLIS, MN 55435

PRIME

Surplus Sale

9655 CPU $40,000 or offer
CDC 9775 675mb $1,500.
Telex GCR tri-density $10,000.
1,000 LPM data printer $2,000.
600 LPM data products $2,500.
Terminals - PT200, PST100, Wise 50, 60 Call
Special Tab ASCII terminals $75. each
ICS 32 ports $6,000.

(409) 842-9355

• BUY NCR • SELL
• SYSTEMS
• COMPONENTS
"SINCE HARWOOD INTERNATIONAL CORPORATION 1976"
• PERIPHERALS
• NEW EQUIPMENT

HARWOOD INTERNATIONAL CORPORATION
100 Northshore Office Park
Chattanooga, TN 37343
615-870-5000
TELEX:3700001 FAX:615-870-5100

Educate your customers through Computerworld Marketplace's *Training Section.*

For More Information Call (508) 879-0700

COMPUTERWORLD
CLASSIFIED
MARKETPLACE

Used/Lease/Rent

SALE or LEASE

DEC 6210 DISCOUNTED

CALL
Bill Miller
(800) 238-6405
(901) 754-6500

IF YOU'RE BUYING, WE'RE SELLING

IF YOU'RE SELLING, WE'RE BUYING
IBM SYSTEMS
Buy • Sell • Lease PERIPHERALS

(800) 331-6283
TOLL FREE

(213) 394-1561
CALIFORNIA

Ocean Computers, Inc.
910 Santa Monica Blvd., Ste. 200
Santa Monica, CA 90401

---

since 1973
BUY • SELL
BROKER • SERVICE

sun microsystems

DEC
DG

Computers • Systems
Peripherals

CAD/CAE Equipment

408-733-4400
FAX: 408-733-8000

WANTED

OBSOLETE AND EXCESS COMPUTER EQUIPMENT

Top Cash Paid

We purchase all types of obsolete or excess computer equipment and peripherals. We pay costs for all shipments as well as top prices.

Call today for a quote on your system.

COMPU-SCRAP, Inc.
Randolph, MA 02368
(617) 341-2695
Call Collect!

DEC - IBM
BUY / SELL

VAXs
MICROVAX II, III SYSTEMS
PERIPHERALS
IBM XT, AT
ALL MICROS
IN STOCK
IBM AT 339s (New & Refurb)
IBM 3174 51Rs (New & Refurb)
IBM 3179-100

LINK PROCESSOR

603 E. Town St.
Columbus, OH 43215
Phone: 614-464-1636
FAX: 614-239-8366

BURROUGHS
UNISYS
B20 - B7000

A Series - V Series

All Peripherals

Low Lease Rates

Depot Maintenance

LDI/
COMPUTER PROVISIONS CORPORATION

(216) 687-0307

$ SAVE $
IBM
DISPLAYWRITERS
AS 400
E S - 9 S 4300

BURROUGHS SYSTEM FOR SALE

Burroughs B-2930 System for sale. Includes 2MB CPU, Operator Console, one 256K B-474 Datacom Processor; B-4464 Disk Subsystem (1200 MB); three B-9445 Tape Drives, two B-9247-14 1200 LPM Printers, all required DLP's. Under full maintenance since installation in 11/83. Available after 2/89. All offers considered. Written offers required on or before 2/24/89. Address offers to: MWR Division (N887), NAVMILPERSCOM, Washington, DC 20370. For more information, contact Tom Tubbs at (301) 863-3680.

SAVE up to 50% on WANG

Get a bang For your buck.
Buy WANG from us!

MONOMEEK LTD.
Second Hand Equipment
24 Peterlee Gate, Unit 17
Downsview, Ont. Canada L4K 1B8

OVERSEAS BUSINESS CALL COLLECT

(416) 736-6300 (416) 736-1000
TELEX 06-986001 TOR. FAX (416) 736-6313

TANDEM EXT NON-STOP

- Perfect as a dedicated development machine or for that stand-alone application.
- Complete System, 2 CPU, 2MB, 2 Disk Drives, 300 LPM Printer, AsyncExtensionBoard & Patch Panel, 3 CRTs
- Available immediately for up to 2 year lease.
- Call 312-433-1110 for details.

Time/Services

NEW!
IBM MVS-ESA Test and Development Center

- IBM 3090/300E - PR/SM
- IBM 3090/120E - Standalone
- Destructive Testing
- Major Database - DB2, IMS
- Worldwide Network
- Early Release Site

Remote Computing Services
24 Hours/ 7 days a Week

- Dual 3090s - MVS/XA, VM
- DEC-VAX, Wang/VS, HP3000
- Extensive Software Available
- Application Proc'ing
- Cost Effective

INNET
INFORMATION NETWORK CORPORATION

NATIONWIDE REMOTE COMPUTING SERVICES

- Fixed Price Computing
- Remote Facilities Management
- General Time-sharing Services
- Image/Forms Design and Laser Printing
- Integrated Financial Applications
- Major Third Party Software Packages
- Micro/Mainframe Applications
- Nationwide Network
- Operating System Conversions
- Overflow Processing

DATA CENTERS:
Boston, MA
Los Angeles, CA
Washington, DC

Lifton
Computer Services

COST-EFFECTIVE COMPUTING SERVICES for TODAY and ... TOMORROW

OUR MODERN DATA CENTER provides you with low-cost, state-of-the-art computing services.

- IBM* CPUs and Peripherals
- Systems Software
  MVS/XA, TSO/E, ISPF/PDF, CICS, VM/XA, VM/SP, HPO, CMS
- Application Software
  Database Management
  Application Development
  4/GLs
  Statistical Analysis
  Graphics
- Multiple Communications Methods
- Technical Support
- Pricing to fit your needs

IBM is a registered trademark of International Business Machines Corporation

For more information
Call Jeff Daum
201-896-2030

Or Write
Jeff Daum
Vice President
P.O. Box 26
Carlstadt, NJ 07072

CONSULTING

Honeywell to IBM
Assembler to Cobol
CICS Macro to Command
DOS to MVS
Any Cobol to any Cobol

Professional staff, experienced in conversion.

Specific methodologies for:
- Conversion Project Management
- Feasibility & Planning
- Technical Conversion

NEOSYNETICS, INC.
3158 Des Plaines Avenue
Des Plaines, Illinois 60018
312/299-0900

Yes, there still is

DEC-20 TIMESHARING

LANDART SYSTEMS INC
65 Broadway
New York, NY 10006
(212) 363-3170

Get into the Market...
Computerworld's Product Classified
MARKETPLACE

Reach Over 612,000 Information Systems Professionals!

Call for all the details
(201) 967-1358
(508) 620-7759
(508) 620-7784
(508) 620 7758

COMPUTING SERVICES

MVS/XA VM/370 DOS/VSE
CICS TSO CMS
DB2 IMS/DBDC 4GL SAS

MULTIPLE CPUs - 50+ MIPS

TELENET, TYMNET
IBM INFORMATION NETWORK

DEDICATED SYSTEMS AVAILABLE

GIS
INFORMATION SYSTEMS, INC.

815 COMMERCE DRIVE
OAK BROOK, IL 60521
312-574-3636

CONVERSION SPECIALISTS

AUTOMATED CONVERSIONS TAILORED TO YOUR NEEDS

DOS TO MVS
HONEYWELL TO IBM
MACRO TO COMMAND
RPG TO COBOL
ASSEMBLER TO COBOL
PL1 TO COBOL
OTHER LANGUAGE/ SOFTWARE CONVERSIONS

BELCASTRO COMPUTER SERVICES
120 MILLCREEK RD NILES, OH 44446
(800) 521-3961

NUECN is a full service vendor who provides solutions to problems in technology and information resources.

MACHINE SERVICES

NUECN's state-of-the-art technical environment (available 24 hours a day, 7 days a week) can be accessed from terminals or personal computers in your home or office.

Processors:
IBM 4381, 3090

Operating Systems:
MVS/XA, VM/SP, DOS/VSE

System Software:
ROSCOE, VM/CMS, TSO/ISPF, IDMS/R, CICS, SAS, FOCUS, BPS, Compilers

Telecommunications:
Async, Bsync, SDLC, SNA, X.25, TCP/IP

CONSULTING SERVICES

NUECN provides high quality consulting services in the areas of communications, systems, and management issues, including:

Local/Wide Area Networks
RFP Preparation/Bid Analysis
Applications Development
Communications, Planning
IDMS, CICS, MVS/XA, and VM/SP

Use of our system is cost effective because you pay only for the computer resources actually used but you have the capability to grow as your data processing requirements change.

For more information, please contact our Sales and Marketing Department.

3800 Park Ave., Edison, NJ 08820
(201) 549-6700

Time/Services

dtl Industries
Telecommunication Consulting
Computers, Networks, & Phone Systems
619-276-1050
Call for free evaluation or additional information
Celebration of the New Year
30% off normal services*
* Upon acceptance of contract by 2-1-89
2798 Cecilia Terrace
San Diego, CA 92180

COMPUTER TIMESHARING
- We broker computer time.
- We find your lowest prices
- Nationwide service since 1966.
- All mainframes.
- NEVER a charge to the Buyer.
- Our fees paid by the Seller.

Call Don Selden at
Computer Reserves, Inc.
(201) 666-6100

COMPUTER SERVICES

MVS/XA	VM/SP
ISPF/PDF	CMS
IMS	SAS
CICS	FOCUS
DB2/QMF	INQUIRE

TYMNET
LASER PRINTING
(415) 768-1300
Unisys 1100/92 Services Also Available
BECHTEL

COMPUTER SERVICES
IBM 3084
- Batch Processing
- Public Network Access
- Timesharing
- Laser Printing

Route 202, Raritan, N.J. 08869
201-685-3400
Contact: Joyce Bogaenko

Hardware

CD-ROM
Drives ready to ship:
Hitachi External Drive $ 659
Toshiba Drive for MAC SE/Plus/II 699
WORM Drive Special - Hitachi 650 MB 2995
Portable 386 w/CD-ROM Drive* 3195
Drive/Title Combos:
Bookshelf or Scholar & Tech. Ref. Set 913
Macintosh Programmer's Library 195
Titles:
Consumer Papers or Electronic Bible 69
CD-ROM Searcher or Graphics Lab 69
C Library or Between Heaven & Hell 59
Consumer Statistics or Hospital Statistics 59
Grolier's Encyclopedia (NEW) 345
Zifff Davis Computer Library (NEW) 195
Oxford English Dictionary 195
Hundreds of CD-ROM titles. Free 100-page catalog.
A MEX/MC/VISA/PO's Accepted
Bureau of Electronic Publishing
18 Leuning Street, Passaic, NJ 07055
(201) 046-3031

Computerworld MARKETPLACE
Where Information Systems Professionals Shop
(201) 967-1358 (508) 620-7758

FOR SALE!
12MHz AT Systems (starting at $1295.00)
20MHz 386 Systems (starting at $2495.00)
Call
NCC
(508) 820-0335

READ ALL ABOUT IT!
- Closing Prices on New & Used Equipment
- Fair Market Value Data
- Computer and Software Training
- Computerworld MARKETPLACE

(201)967-1358
(508)620-7758
(508)620-7759
(508)-620-7784

Software

STATE OF CALIFORNIA DEPARTMENT OF PARKS & RECREATION
Looking for a class registration & management program. Program to run on micro computer. Seller must have several programs installed & operating within the U.S. in firms that are not a subsidiary of the author.
Send information to:
Clark Way
c/o OHMVR
P.O. Box 942896
Sacramento, CA 94296-0001

Computerworld MARKETPLACE
Where Information Systems Professionals Shop
Call for information:
(201) 967-1358 (508) 620-7758

FREE BUYER'S GUIDE
When you need programmer's development tools, Programmer's Connection is your best one-stop source. We are an independent dealer representing more than 300 manufacturers with over 800 software products for IBM personal computers and compatibles including COBOL compilers and utilities, relational databases, and much more. Call today to receive a FREE comprehensive Buyer's Guide, and find out why Programmer's Connection is your best connection for software tools.
Programmer's Connection
7249 Whipple Ave NW
North Canton, Ohio 44720
US 800-336-1166

Canada	800-225-1166
OH & AK (Collect)	216-494-3781
FAX	216-494-5260
Telex	6102406879
International	216-494-3781

Attn: All XEDIT Users
Our company offers Xedit tools that enhance any Xedit session -
- Cut and Paste parts of lines
- Over 30 new prefix commands
- Many new macros (PF keys)
- Benefits all Xedit users
- Help files and documentation
- Full support and maintenance
- Commented source code
- Updates as tools are enhanced
- New tools as they are developed

- and for only $500.

We also offer Rexx tools including:
- Rexx pseudo-compiler
- Rexx source formatter

Call today for a free 30 day trial run.
(214) 750-8112
Billy Guthrie
SIDNEY
Dallas, TX

Bids/Proposals/Real Estate

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY
Sealed proposals will be received by the CDPA, 301 N. Lamar St., 301 Building, Suite 508, Jackson, MS 39201 for the following equipment and services:
Request for Proposal No. 1473, due Friday, January 20, 1989 at 3:30 p.m. for the acquisition of a local area network with server, 10 workstations, supporting LAN hardware and software for the Science and Mathematics Division at SOUTHWEST COMMUNITY COLLEGE. No charge.
Request for Proposal No. 1474, due Tuesday, January 24, 1989 at 3:30 p.m. for the acquisition of two 9348 cartridge tape subsystems and one IBM 3480 controller for the Computer Center at the UNIVERSITY OF MISSISSIPPI MEDICAL CENTER. No charge.
Request for Proposal No. 1476, due Friday, January 13, 1989 at 3:30 p.m. for the acquisition of a minicomputer-based system to replace an existing IBM System/34 computer at SOUTHWEST MISSISSIPPI COMMUNITY COLLEGE. No charge.
Request for Proposal No. 7795, due Tuesday, January 31, 1989 at 3:30 p.m. to obtain information related to optical imaging technology for the SECRETARY OF STATE'S OFFICE of the State of Mississippi. No charge.
Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and modifications.
Patsy Stanley (601) 359-6004

REQUEST FOR PROPOSALS
FINANCIAL INFORMATION SERVICES AGENCY (FISA)
CITY OF NEW YORK
The Financial Information Services Agency of the City of New York is seeking proposals for Remote Computer Display Configuration Equipment.
Copies of the Request for Proposals may be obtained from Ms. Marlene Chiron at the Financial Information Services Agency at 111 Eighth Avenue, 13th Floor, New York, NY 10011 or by phoning Ms. Chiron at 212-206-3311
A Proposers' Conference will be held at 11:00 A.M. on January 13, 1989 the deadline for receipt of proposals is 5:00 P.M. on January 27, 1989.
Further details re the conference, specifications and proposal submission may be found within the Request for Proposals.

Get into the Market...
Computerworld's Product Classified MARKETPLACE
Reach Over 612,000 Information Systems Professionals!
Call for all the details
(201) 967-1358 (508) 620-7758
(508) 620-7784 (508) 620-7759

Graphics/Desktop Publishing

PC MONITOR TO BIG SCREEN from $787
BOXLIGHT CORPORATION

The Classified MARKETPLACE
Featuring:
- Used/Lease/Rent
- Hardware
- Software
- Communications
- Peripherals/Supplies
- Time/Services
- Graphics/Desktop Publishing
- Bids/Proposals/Real Estate
- Business Opportunities
- Training

For more information call:
1-800-343-6474
or in Mass (508) 620-7700

Computerworld's MARKETPLACE section
Looking for a way to reach information systems professionals with your advertising message? Call a Computerworld product classified sales representative for all the details on the Marketplace sections.

Southeast
(201) 967-1358
Northeast
(508) 620-7784
Midwest
(508) 620-7758
West
(508) 620-7759

Business Opportunities

CALIFORNIA 13,000 DP SITES
We divide our list into 3 areas: LA County, So. Calif. and No. Calif. (available 1/89). Price: $325 each.
The company name, address, DP executive's name, title, phone no., and the type of hardware installed is profiled.
Each list is available on labels or in book form either alphabetically or by city or zip code — it's your choice. We guarantee accuracy, since every day 130 sites are updated until at 6 months we call site No. 1 again. As a result, we only print after we receive your order to give you the most current list available in the industry. Delivery: One week.
PHOENIX COMPUTER SERVICE
8949 Reseda Blvd., #107
Northridge, CA 91324
(818) 349-0782

Computerworld's MARKETPLACE section
Looking for a way to reach information systems professionals with your advertising message? Call a Computerworld product classified sales representative for all the details on the Marketplace sections.
Southeast
(201) 967-1358
Northeast
(508) 620-7784
Midwest
(508) 620-7758
West
(508) 620-7759

Peripherals/Supplies

GENUINE HEWLETT PACKARD TONERS
$79.50 each
Huge Inventory in Stock
For Same Day Shipment Call
+1-800-22-TONER
+1-800-226-8637
Printer Supplies At Similar Savings
TONERS PLUS

SHOP in...
Computerworld's Product Classified MARKETPLACE
Call for details!
(508) 620-7784
(508) 620-7758
(508) 620-7759
(201) 967-1358

Hiring to remain cautious in '89

Employment will improve steadily but slowly; consulting will show strength

BY ALAN RADDING
SPECIAL TO CW

Barring unforeseen economic developments — such as a recession prompted by financial dislocations — MIS professionals can expect to see slow improvement in the career picture during 1989.

"We expect 1989 to be up a little bit, but not too much," says Herb Halbrecht, president of Halbrecht Associates, Inc., a Stamford, Conn., executive search firm.

Despite corporate budget tightening, firms will continue to fund MIS as long as top management remains convinced about its value, Halbrecht says.

Since the 1987 stock market crash, numerous companies, particularly in financial services, have cut back development to save money, according to Roger O'Connor, a staff consultant at Edward Perlin Associates, Inc., a New York-based compensation consulting firm.

O'Connor says he expects cost containment to still dominate in 1989 but has noticed a thaw in the development freeze and opening up of hiring. "It'll probably continue to loosen up in the first quarter," he says.

An executive at Salomon Brothers, Inc. says the brokerage and investment banking firm is hiring at a slow, steady pace. "But I don't think we'll ever see the incredible hiring of two or three years ago," he notes.

Government boom

Perhaps ironically, one of the brighter hiring spots may be the government sector. Despite intensifying concern about the federal budget deficit and some financial worries at the state and local levels, computer professionals say they see signs of a robust employment picture for 4MIS people in government.

"One way government agencies tighten up is to automate to boost productivity," says Fran Abernathy, president of Abernathy Business Consultants, Inc. in Gaithersburg, Md., which specializes in computer consulting for government.

Government computer procurement contracts, such as the recent U.S. Air Force order for minicomputers, show that several large government agencies are actively automating, according to Abernathy. She says that she has also noticed increased work with state and local government.

When consultants are busy, increased MIS employment often follows as employees are hired to implement and operate new systems, Abernathy adds. "We usually advise on what skills are going to be needed in-house," she notes.

Consultants also are busy in the corporate sector, especially in areas in which the labor market is so tight that companies have trouble attracting skilled employees. "They are turning to consulting firms, and the consulting firms are hiring in droves," says Ellen Saunders, director of sales at Computerpeople Consulting Services in Worthington, Ohio.

Throughout the Midwest, a growing service sector and a resuscitated manufacturing sector appear to be keeping demand for MIS professionals high, Saunders says.

On the East Coast, there is strong demand for programmers and programmer/analysts with one to four years of experience, reports Janice Serinese, marketing director of Automated Concepts, Inc. in New York, another consulting firm. Some openings are created as data centers move out of New York to the suburbs, albeit with a corresponding number of displaced workers.

There is a definite falloff in demand at the top of corporate MIS pyramids. "There is a consolidation going on at the senior level because of all the mergers and acquisitions," says Victor Janulaitis, president of Positive Support Review, Inc., a consulting firm in Los Angeles.

The corporate restructurings of the past several years show no sign of abating. MIS is sure to suffer in the long run whenever there is a merger or acquisition, Janulaitis says. "MIS is often a key component in a merger. Basically, you don't need two central MIS operations," he says.

But despite the consolidations, on the West Coast, Janulaitis says, "there is a dearth of good talent, in the $50,000 to $75,000 salary range." These people are the project leaders still three to five years from senior-level positions.

In the Southwest, the economy remains sluggish, reports John MacDonald, a partner in the Dallas office of Big Eight accounting and consulting firm Arthur Young. The weakness in the oil industry, which has spilled over to banking, finance and real estate, has cut demand for MIS professionals.

"People don't have high expectations for 1989. A lot of people thought a turnaround would come earlier, and it didn't," MacDonald says.

Skill set

The MIS skill areas expected to be most in demand in 1989 are relational databases, telecommunications and networking. Expertise in Unix and personal computer systems, including PC management, will also show strong growth in 1989, observers say.

Recruiters and others following the MIS job market expect salaries to remain steady, with small, incremental increases in the neighborhood of 4%, although on the West Coast, Janulaitis says he expects salary increases to average about 7%.

Recruiters report a significant reduction in job hopping recently, a development typically associated with a slack pace of hiring. The caution is reinforced by the possibility of unexpected takeovers and restructurings, according to Edward Perlin's O'Conner. "More people are staying put," he says.

> THE MIS areas expected to be most in demand in 1989 are relational databases, telecommunications and networking. Expertise in Unix and personal computer systems, including PC management, will also show strong growth in 1989.

Radding is a Boston-based author specializing in business and technology.

Data Communications

IBM and DEC Compatibility Products

The Software Products Division of Sun Microsystems, Inc., creates, markets, and delivers quality software products that run on Sun and non-Sun computers. This means products that are focused in areas which leverage Sun's overall business are targeted at customers who can improve their productivity with sophisticated and powerful software tools. This also means providing a development environment that is second to none.

Needed are:
- IBM Channel Programmers
- Developers • Architects
- Project Leaders

Excellent opportunities exist for communications professionals with a broad communications background. You should have experience with IBM or DEC protocols; or IBM channel programming. A BSCS with C experience is required. A MSCS is preferred. UNIX® experience is strongly preferred.

The challenges, as well as the rewards, will be substantial. Please send a resume to: Herman Collins, Mail Stop LL, Sun Microsystems, Inc., 2550 Garcia Avenue, Mountain View, CA 94043 or call (415) 336-1057. An equal opportunity employer; principals only, please. "UNIX is a trademark of AT&T. The Sun Microsystems logo is a trademark of Sun Microsystems, Inc.

sun microsystems
Systems for Open Computing.™

ORLANDO
S/38

CAP GEMINI AMERICA is one of the leading data processing consulting firms in the United States, with over 2,400 employees in over 40 branches. We have immediate openings in the Orlando, Florida office for quality professionals with experience on the S/38 or AS/400.

If you are looking for a career, not just a project, we are ready and eager to talk with you. We offer competitive salaries, full benefits, relocation assistance and exciting long-term challenges.

We have dozens of additional opportunities for experienced professionals with either UNIX or IBM mainframe backgrounds. Please talk to us to see how you can become part of our Orlando team.

CAP GEMINI AMERICA

2700 Westhall Lane, Suite 130
Maitland, Florida 32751
(407) 660-8833

Equal Opportunity Employer M/F/H/V

Software Applications Manager

Los Angeles

We are a rapidly expanding consumer products leader with nationwide sales in excess of 500 million. An immediate need exists for a Software Applications Manager to direct all PICK-based systems throughout the organization. This is a new position based at our division offices in the Los Angeles area.

The successful candidate will possess a minimum of five years "hands-on" project management experience within a PICK-based environment. Additionally, proven analysis, design and technical programming skills are necessary. Strong financial, inventory and distribution applications are highly desirable. Exposure to customer service center operations and PRIME/General Automation hardware is a plus.

If you are a mature MIS professional with a team player attitude and your plans include working for an industry leader offering career advancement and an excellent compensation and benefits package, send your resume including salary history in confidence to:

CW-B5109
COMPUTERWORLD, Box 9171
Framingham, MA 01701-9171

Equal Opportunity/Affirmative Action Employer

EG&G Idaho, Inc., the prime operating contractor for the Department of Energy's National Engineering Laboratory (INEL) has openings for the following Engineers:

SOFTWARE ENGINEERS

Candidates should have 2-5 years experience in software development, experience with requirements analysis and experience with UNIX and C. Desirable traits include database and artificial intelligence backgrounds and familiarity with structured development methodologies.

SYSTEM DIAGNOSTIC ENGINEER

Define system diagnostic requirements, survey commercial products, plan, develop and integrate sytem diagnostic tools. Candidates should have skills similar to the above position.

DISTRIBUTED DATABASE SOFTWARE ENGINEER

Responsible for the design and development of the application/database distribution software. Candidate shall provide technical leadership, technical interface and client technical interface. Senior technical experience, systems level design experience, C, ORACLE, SQL, and UNIX experience (or equivalent) are required.

SOFTWARE QUALITY ASSURANCE ENGINEER

Candidates should have 2-5 years experience in software testing and V&V. Experience with C, ORACLE, SQL, and UNIX highly desirable.

Idaho Falls is located in the heart of the country's most scenic recreational areas. If interested and qualified, please submit resume with salary history, in confidence to: Employment Services, (TB-96), EG&G Idaho, Inc., P.O. Box 1625, Idaho Falls, Idaho 83415-3127. We are an equal opportunity employer M/F/H/V. U.S. Citizenship required.

Unix is a trademark of AT&T

EG&G

MANAGER
Clinical/Patient Care Systems
San Diego Area

As San Diego's leading healthcare organization, Sharp HealthCare's commitment to state-of-the-art technology enables you to apply your information systems expertise to the integration of clinical systems within our local multi-facility network. Our medium-size information systems department is currently seeking an MIS professional to be responsible for management of all clinical/patient care information systems.

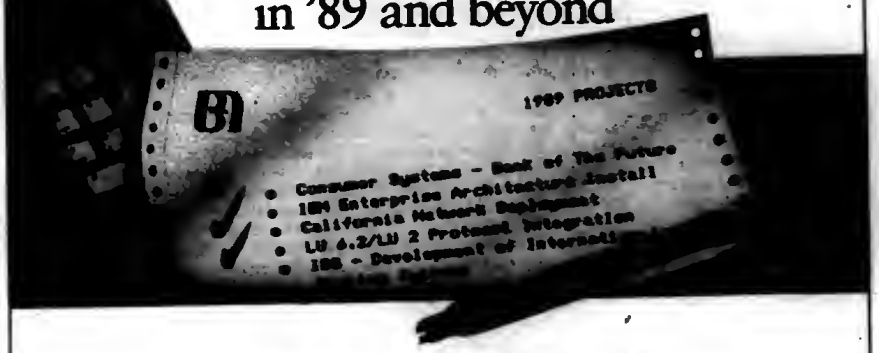
This position requires a BS in Computer Science or related discipline and 3-5 years' project and management experience with an emphasis in clinical/patient care systems support. Programming experience with MUMPS/MIIS software is preferred. Must have background in a healthcare computer environment utilizing Data General or DEC minicomputers running multiple applications.

We offer an excellent salary and benefits package including 3 weeks paid vacation. If you are seeking a management position in which you will be directly involved in new product selection and implementation, please send your resume and salary history/requirements, to: Human Resources-Employment, 7901 Frost Street, San Diego, CA 92123. 619/541-3222. Equal opportunity employer.

SHARP HEALTHCARE

Systems & Applications Professionals

Forecast for Success in '89 and beyond



It's no small task to keep a multibillion dollar bank at the cutting edge of technology. But it's the highest priority at Bank of America's Technology Center in Concord. Here, 2,500 technical specialists concentrate on development and maintenance projects in a state-of-the-art environment. It's the ideal setting for synergistic achievement and will continue in '89 to promote an open exchange of ideas, proving that bigger can be better. The larger projects are, the greater your contribution. Performance is readily recognized and excellence rewarded. And with substantial funding channeled into training and employee development, you'll find the opportunity and resources you need to achieve. If you're ready for a challenge in 1989, here's your opportunity to choose.

Data General Programmers
5+ years heavy DG AOS/VS
3+ years Assembler, C, or COBOL
Payroll or HRIS experience

Tandem Programmers
2+ years TAL with EFT experience
3+ years SCOBOL, Pathway & TMF
Systems Resource Management

IMS, CICS & COBOL Applications Programmers
5+ years Senior level COBOL systems experience
3+ years programming on-line CICS-VSAM
3+ years IMS DB-DC or IMS ADF on-line

PC LANs Professionals
2+ years IBM-PC, PS2 & C language
2+ years IBM Token Ring LAN-NETBIOS

Systems Programmers
VM, CICS, DB2, MVS, IMS

NOMAD2 or Mark IV Programmers
4+ years NOMAD2 or Mark IV expertise
COBOL, PL1, SAS, or DB2 is a plus

CICS, IMS, & DB2 DBAs
5+ years as a CICS or an IMS DBA with VSAM
5+ years IMS DB-DC, IMS-ADF
Heavy DB2, VSAM, Datamanager, and UCC10

DEC-VAX Professionals
VMS Internals
SNA experience
Message switching

System 38 or System 34/36
4+ years expertise with CL and RPGIII
3+ years heavy RPGIII

Office Automation
5+ years Microcomputer, LAN or OA expertise
5+ years Systems Account Rep.
2+ years Programming/VM or Wang experience

Telecommunications Analysts
VTAM/IMS Network
SNA, NCP, NCCF, NPDA
RS-232, T-1

TPF-Communications Systems Programmers
TPF Communications Software
SNA/BSC Protocols
Network Connectivity
VTAM/NCP Software

TPF-Applications Developers
3-5 years ACP/TPF experience
ACP/DB Database Macros
ACP/TPF Test Tools, VM/CMS
Full System Development Life Cycle

Investigate what Bank of America Systems Engineering can offer. Please send your resume with salary history to: Paul Burenin, Bank of America, BASE Staffing CW-70755, Dept. 3228-PB, P.O. Box 37000, San Francisco, CA 94137. Bank of America is an equal opportunity employer.

Bank of America
Doing the job.™

Bank of America NT&SA Member FDIC

©1988 BankAmerica Corporation

CaseWare®, Inc. a successful 12 year old software engineering company is seeking software professionals in the following Areas:

SENIOR SOFTWARE ENGINEER

Must have 5 plus years of commercial product development experience in a UNIX & C environment. Applicants should have worked with DBMS's of a host language interface level or been involved with data base design/performance tuning issues.

We are also seeking an experienced UNIX Systems Administrator.

Join our new products division working on advanced CASE solutions. Send resume to:

CaseWare®, Inc.
New Products Dept.
1500 Corporate Drive
Costa Mesa, CA 92626
No phone calls please

Attention Programmers

Why sell off the rest of the profession, or worse yet, pretend that what we do is simple.

For 10 years, I've specialized exclusively in placing programmers, analysts & systems programmers in large MIS shops throughout the nation.

Because today we care about the fact why it would be in your best interest to contact an agency that needs more money. Gives you more top priority. Send resume to Robert Montgomery or call 919-787-9555 • FAX 919-787-4780

The Data Group
P.O. Box 52055
Raleigh, NC 27612

IT'S CALLED THE GOLDEN GATE FOR GOOD REASON

Systems professionals can discover career enrichment and personal satisfaction through the rewarding positions available with our prestigious clients. Logical Options and Sanderson Associates have merged forming Northern California's premier Search Firm

THE SEARCH FIRM, INC.
685 MARKET STREET, SUITE 1000, SAN FRANCISCO, CA 94105
(415) 777-3900 FAX 777-8652

Technical Support Services

DTA, the Midwest's largest Technical Support Consulting firm, has openings in two locations.

DTA provides IBM customers with contract support services in the following areas:

- System Software Installation & Support (VMS, VM & VSE)
- DBA Installation & Support (IMS,DB2 & IDMS)
- Operations Consulting & Support (MVS, VS &VSE)
- Telecommunications Planning & Support (VTAM & NCP)
- Advanced CICS Technical Application Support
- Teleprocessing Monitor Support (CICS, IDMS-DC, IMS-DC)
- Capacity Planning, Problem Determination
- Remote Dial-up Support

We offer competitive benefits, including a bonus program, 401(k), Profit Sharing, Tuition, Dental and 100% Medical Reimbursement.

If you desire to be the best in your technical field and assist numerous clients with implementing their technical solutions, contact either of our offices:

550 Waterford Park
505 North County Road 18
Minneapolis, Minnesota 55441
(612) 591-6153
Contact: Debra

103 Midwest Plaza South
2021 Midwest Road
Oak Brook, Illinois 60521
(312) 620-1322
Contact: Harold

An Equal Opportunity Employer
No Agencies Please

DTA

Bringing Peace of Mind to Customers through Technical Support

FLORIDA NEEDS

- IDMS/R
- ADSO

ALL LEVELS

P/A - SR P/A - ANALYST PROJ LDR - DBA

SALARIES RANGE FROM $22,000 - $50,000

Call or Mail Resume to

ROBERT HALF OF TAMPA
P.O.Box 22651
Tampa, FL 33622
(813) 876-4191

PROG/ANALYST
$30 - 55K
National Opportunities
IBM

S/3X or AS400 (RPGII, III) to $42K
4300 or 3000X (COBOL, CICS) ..... to $55K
4300X or 3100X (DBQ) ..... to $38K
4300X (ADABAS NATURAL) ..... to $48K

Many Other Positions Available

Call or Send Resume To:
(901) 380-8091
FAX (901) 380-0813
CORPORATE IMAGE GROUP
2735-47 S. Mendenhall
Memphis, TN 38115

Computer Consulting firm in Chicago area has an opening for a software engineer. Job duties are mathematical modeling, flow charting, and programming in Fortran on DEC computers using VAX/VMS. Applicants should have an MS degree in computer science/electrical engineering with course work in Fortran and C language on DEC/VAX computers using VMS. 40 hours per week, 8:30 am to 5:00 pm, $31,400 per year. Please send resume to: Minta Dept. of Employment Security, 401 South State St, 35south, Chicago, IL 60605. Attn: Robert S. Patton, Ref: #V-8.6657-F

PROGRAMMER ANALYSTS LARGE SCALE IBM ENVIRONMENT

Freightliner Corporation is a major manufacturer of heavy duty diesel trucks and the importer of Mercedes-Benz trucks. We have openings for Programmers and Programmer Analysts who meet the following requirements:

- One to two years of current Cobol programming experience on large scale IBM computers
- One year writing Cobol programs using IMS/DB/DC or DB2
- Strong user interface experience and preparation of design documentation required
- Associate Degree in Computer Science or a BS in Computer Science is desired

Our operating environment is MVS/XA, IMS, DB2, TSO/ISPF, Panvalet, CICS, Cobol, Focus, and Easytrieve. Systems applications will be in support of Parts Distribution, Manufacturing, Sales, or Engineering.

Freightliner offers a competitive salary and comprehensive benefits program. Relocation assistance may be available. If you are attracted to the affordable Pacific Northwest and a professional organization committed to career development, send your resume including salary history to:

PERSONNEL ADMINISTRATION
FREIGHTLINER CORPORATION
Post Office Box 4750
Portland, OR 97208-4750

Equal Opportunity Employer
No Agency Referrals Accepted

PROGRAMMER ANALYST

Position with the City of Colorado Springs, experienced should include 4300X computer system using CMS/VS/XA, CICS, JCL, TSO, and USAM. Responsibilities include: analyze and write new programs, modify existing programs, maintain and update system and application documentation. MUST HAVE: Option 1 - Bachelor's Degree in Computer Science, Management Information Systems, or a technical field involving computer science course work; two years of applications programming experience involving the use of COBOL. Option 2 - Bachelor's Degree; three years of applications programming experience involving the use of COBOL, or an equivalent combination of education and experience. DESIRABLE: Knowledge of EzTrieve Plus, Panvalet, Answerbook Software Inc. (ASI), or Insyst Pacific Systems in a plus.
SALARY: $2371-2745/month

A City application must be received by 1/13/89, and may be obtained by calling 719-578-6666. AA/EEO

Faculty Positions
Computer Science Department

One or more full-time graduate faculty positions starting September, 1988, or January, 1989. Teaching and working with Graduate students in Artificial Intelligence, Data Communications, Software Engineering, and Systems Programming. Required: doctorate (or all but dissertation) in computer science or related area, college teaching experience, and research accomplishments. Rank and salary dependent on qualifications. Summer teaching and assistant lunges. Send inquiries, vita (including three references) by March 15, 1988, to Dr. Don Henderson, Computer Science Department, Mankato State University, Box 225, Mankato, MN 56002. An EO/AAE.

DIRECTOR OF MIS

The Company is a major mid-western manufacturer of consumer products that is looking for a Director of MIS. Successful candidates should have:

- Experience in a fab & assembly manufacturing environment.
- Experience with medium sized computer systems.
- Experience with packages for manufacturing applications.
- A computer science or other technical degree.

The company is located in a small town. If interested send resume with salary history to: Chairman of the Board, Box 6005, Orlando, FL 32854.

Now... you can recruit the right people in the right places at the right price.

With the new IDG Communications Computer Careers Network, you can run the most targeted and cost-efficient recruitment program possible. You simply choose the combination of eight leading newspapers - Computerworld, InfoWorld, Network World, Digital News, Federal Computer Week, and Computer Currents/ Northern California, Southern California, and Boston editions - that's right for you.

For all the facts on putting the Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you. Or contact John Corrigan, Recruitment Advertising Sales Director, at 508-879-0700.

Sales Offices: BOSTON: 375 Cochituate Rd, Framingham, MA 01701, (508) 879-0700; NEW YORK: Paramus Plaza I, 140 Rte 17 North, Paramus, NJ 07652, (201) 967-1350; WASHINGTON: 3022 Javier Rd, Ste 210, Fairfax, VA 22031, (703) 573-4115; CHICAGO: 10400 West Higgins Rd, Suite 300, Rosemont, IL 60018, (312) 827-4433; LOS ANGELES: 18004 Sky Park Circle, Ste 100, Irvine, CA 92714, (714) 250-0164; SAN FRANCISCO: 18004 Sky Park Circle, Ste 100, Irvine, CA 92714, (714) 250-0164

It's the efficient way to recruit qualified computer professionals.

Now you can target your recruitment advertising to the qualified computer professionals you want to reach - where you want to reach them. All you need is the new IDG Communications Computer Careers Network. Here's how it can work for you:

You choose the newspapers. Depending on who you're looking for, you can select the combination of eight newspapers that best suits your needs - **Computerworld, InfoWorld, Network World, Digital News, Federal Computer Week,** and **Computer Currents**/Northern California, Southern California, and Boston Editions.

You choose the region. If you wish to recruit within a specific area, you can advertise in the regional editions of the newspapers you choose - East, West, or Midwest. Of course, national buys of individual newspapers or various combinations are also available when you need to extend your reach.

You don't pay for readers you don't want. Gone are the days when you have to worry about paying for waste circulation. The Computer Careers Network puts you in touch with qualified computer professionals - and only those qualified computer professionals you need to reach.

To put the new Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you. Or contact John Corrigan, Recruitment Advertising Director, at (508) 879-0700.

Sales Offices:
BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (508) 879-0700;
NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652, (201) 967-1350;
WASHINGTON: 3022 Javier Road, Suite 210, Fairfax, VA 22031, (703) 573-4115
CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433;
LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0164;
SAN FRANCISCO: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0164;

GRUPPO

AGUSTA

SYSTEM 38 PROGRAMMER/ANALYST

AGUSTA AEROSPACE CORPORATION located in the Northeast Philadelphia area in the Greater Delaware Valley, is expanding it's Information Systems Department, and there are several openings for Programmer/Analysts.

This is an excellent opportunity for an individual with a broad applications background with an IBM System 38.

To qualify, candidates must possess the desire to work directly with the user to develop systems and program specifications. In-depth experience writing RPGIII programs and systems testing is required.

AGUSTA offers an excellent salary and compensation package, including a 401(K) plan and relocation package as well as state-of-the-art facilities. For advancement opportunity, put your career in the hands of a growing industry leader.

For immediate and confidential consideration, please send resume and salary requirements to: Personnel Department.

AGUSTA AEROSPACE CORPORATION
3060 Red Lion Road, Philadelphia, PA 19114

Equal Opportunity Employer M/F/H/V

CHALLENGE

[redacted]

Analysts/Programmers

Merillat Industries, the nation's largest kitchen and bath cabinet manufacturer, is seeking several individuals with various years of experience on an IBM System 36 or IBM System 38.

Candidates should have experience in the design, programming, testing, documentation, and implementation of various applications using COBOL and RPG programming languages. A degree in Data Processing or related field and IBM PC Series I experience are desirable.

We offer an excellent compensation package with the industry's most progressive manufacturer. For consideration, please send resume, including salary history, to: **Mr. Don Roche, Manager of Corporate Employment, Merillat Industries, Inc., Corporate Headquarters, P.O. Box 1946, Adrian, MI 49221.** Equal Opportunity Employer

AMERICA'S CABINETMAKER™

MERILLAT INDUSTRIES, INC. A MASCO COMPANY

AI/EXPERT SYSTEMS LEAD RESEARCHER

$45,000 - $65,000

Our client, a prestigious Scientific Information Retrieval/Reference Institution, has a unique opportunity for a Senior Researcher with a strong background in Artificial Intelligence/Knowledge Based Systems interested in applying leading edge AI technologies to assist major enhancements of one of the world's largest and most sophisticated information retrieval/reference systems. You will work in an established advanced development group with senior management support for long term research and development. You should be a leader capable of analyzing system requirements and designing and implementing your own programs. You will be the in-house AI guru. The ideal candidate will have an undergraduate degree in Chemistry or a related field with an MS or PhD in Computer Science and related work or academic AI experience. For consideration call 301-340-2210 (collect) or send resume to:

JDG ASSOCIATES LTD.
1700 Research Boulevard
Rockville, Maryland 20850

We've picked up a lot of power in the last few years.

ENERGIZER

Since becoming part of Ralston Purina, Eveready Batteries has tightened its leadership position more than ever. And that also means great career opportunities for the same kind of entrepreneurial professionals. We have immediate openings for:

DEC • VAX Professionals

These positions are available in the Systems Planning Department of Eveready Battery Company, Inc., an affiliate of Ralston Purina Company. As a programming professional, you will be involved in heavy end-user interactions as well as heavy coding, testing and debugging. Positions are available on many levels of experience. Qualifications include strong analytical skills, design and COBOL programming experience in a DEC VAX environment and a BS or equivalent with a minimum of 2+ years' experience. Previous work with 4th G/L, database management, DEC utilities or DEC productivity tools would be a plus.

Eveready Battery Company, Inc. offers an excellent salary and benefits package along with outstanding career advancement potential. Qualified applicants should send resume to: **RALSTON PURINA COMPANY; Corporate Employee Relations; Department J-1; Checkerboard Square; St. Louis, MO 63164.** An Equal Opportunity Employer M/F/H/V.

Ralston Purina Company

You can always expect the best.

Project Leader

NEC Home Electronics (USA) is one of the nation's leading producers of computers and audio-video products. We seek a seasoned professional to work with top management to define and resolve customer service parts systems strategy, design and development. You will manage the study, proposal, design, construction and implementation of major systems to achieve business objectives.

Successful candidate will bring experience in service parts management, system project development and operation and general business practice in distribution, customer service and manufacturing. A minimum of 5-7 years related experience, 2 years of which in project management required. MBA or equivalent desired.

NEC will provide a generous compensation/benefit package. Submit resume with salary history to: Human Resources Dept. BB/CW94, NEC Home Electronics (USA) Inc., 1255 Michael Drive, Wood Dale, IL 60191-1094. Equal opportunity employer m/f.

NEC NEC Home Electronics (U.S.A.) Inc

SOFTWARE OPPORTUNITIES

Openings coast to coast

MVS/XA, Sys Proj	$50K
IDMS, Tech Support	$52K
COBOL, CICS, P/A	$40K
VAX FORTAN MFG	$38K
UNIX Internals	$55K
COBOL IMS P/A	$40K
INS Systems Proj Ldr	$50K
VM/CMS Internals	$47K
ASSEMBLER IBM P/A	$38K
LIFE70 or Lifecomm	$45K
DATACOM P/A	$32K
VAX Oracle	$40K
UNIX, 'C' Small Developers	$42K
IDMS Proj Ldr	$52K
IMS or DB2 DBA	$55K
FOCUS, IMS, P/A	$37K
IDMS P/A	$38K
COBOL, P/A	$35K

Call 713-499-5300

or mail resume to:

THURMAN & ASSOC.
P.O. Box 980002
Houston, TX 77289-0002

DBC $34,000

Well established software firm seeks Programmer/Analyst. PDP, RSTS/E, BASIC+2. Co will relocate.

S/A $60,000

Fortune 100 co seeks Systems Analyst. IBM 38. RPG III. Degree a plus. Co will relocate.

EMPLOYMENT SERVICE
DATA PROCESSING
1200 East Oak Blvd.
#1470
Houston, Texas 77008
800/388-1984

PROGRAMMER SYSTEM 38

NEW, CHALLENGING
Mail Order Opportunity!

You'll enjoy the chance to create and develop our in-house software and support conversion to AS/400. START IMMEDIATELY preparing and computerizing DP functions with management and users. Write, implement and troubleshoot applications on our System 38 and IBM PC's, using your 2+ years experience with RPGIII. Challenges aplenty, unusual depth and range to demonstrate your talents and training await you. CALL: 312-362-0288. (No agencies or consultants, please).

DP Manager
THE POPCORN FACTORY
13970 W. Laurel Drive
Lake Forest, IL 60045
equal opportunity employer m/f

Just Rewards.

That's just what you'll receive from PSC if you're proficient in software development – lots and lots of justified rewards for your skills and hard work.

Rewards like outstanding salary and benefits, consistent career growth, challenging projects and prestigious positions from programming through DBA to project management.

Justifiably, we reward a lot because we require a lot – technical expertise ... interpersonal savvy ... an attention to details...

Now hiring for immediate openings in:
ORACLE • INFORMIX • NATURAL
DB2 • PRIME • COBOL • CICS
UNIX/C • VAX/VMS • MS-DOS/C

... If you have what it takes, call David Graziano, Vice President of Recruiting at PSC to learn more about getting your just rewards.

Rewarding Careers for Remarkable People.

11720 Borman Dr., Suite 108 St. Louis, MO 63146
(314) 567-1366

[illegible] Mosco Corporation [illegible] Executive Recruiter–T.BM, 21[illegible] West Bom Road, Taylor, MI 48180. [illegible] Opportunity Employer M/F.

Systems & Operations Manager

An exceptional career opportunity exists at Hurley Medical Center for a highly skilled manager to develop and implement procedures to ensure efficient database design, and total systems operations within a rapidly expanding IBM mainframe environment. The position requires a baccalaureate degree with a minimum of sixteen semester credits in computer science and four years of experience as a system programmer working with DOS/VSE in an IBM 370 environment, or six years of experience as a systems programmer working with DOS/VSE in an IBM 370 environment. We provide an excellent salary with a comprehensive benefit package. Apply to: **Tyree Walker, Assistant Personnel Director, Hurley Medical Center, One Hurley Plaza, Flint, MI 48502. 313/257-9140, or within Michigan, Toll-Free, 1-800-572-2374.** We are an Equal Opportunity Employer M/F/H/V.

COMPUTERWORLD's COMPUTER CAREERS!

As the industry grows, so will **COMPUTERWORLD.** This is not a phrase we took lightly. We will continue to offer the high quality news coverage and editorial content that has attracted our readers since our beginning. But we also must continue to grow. What does that mean to you, our advertisers? Good news...in the form of wide exposure. We offer a feature topic to each weeks Recruitment ads. This allows for us to target your specific market. In addition to the attractive format, it is easy to read. We offer a variety of topics which we have listed below:

JAN '89		
	1/9	MBA or MS graduate degrees; which is better for whom?
	1/16	MIS managers on the pros and cons of regular job changers
	1/23	Success rate of computer pros turned consultants
	1/30	Leveraging MIS experience into a job in another department
FEB '89		
	2/6	Opportunities in EDI (Electronic Data Interchange)
	2/13	The role of corporate culture in job satisfaction
	2/20	MIS managers describe what impresses them when interviewing job candidates
	2/27	Outlook for PICK operating system experts
MAR '89		
	3/6	Opportunities selling Systems Integration and other DP services
	3/13	A status report on Wall Street opportunities
	3/20	What MIS looks for from MBA holders
	3/27	Software development: comparing MIS and vendor jobs

So, as a nationwide publication, we give you the exposure you want. As a weekly publication, we give you the immediacy your advertisements need.

COMPUTERWORLD publishes every Monday with an ad deadline of 7 days prior to each issue date. You may send in copy to be pubset or camera-ready material (velox or negative) via the mail. We provide telecopier service and will also take ads over the phone. We now have an answering machine which will take your calls/reservations even after business hours on the east coast. Please call either number listed below and indicate you would like Classified Advertising and you will be immediately connected to the machine. It's as easy as that!

Our mailing address is

COMPUTERWORLD
Classified Advertising
Box 9171
375 Cochituate Road
Framingham, MA
01701-9171

Or call for more information at

1-800-343-6474 or,

in Massachusetts, **(508) 879-0700**

"Computerworld is the only place we advertise."

— Peter Jozwik
President
The Search Firm
San Francisco

Peter Jozwik, President of The Search Firm, makes it clear that his company is a recruiting organization, *not* an employment agency. Recruiting firms like his locate qualified personnel to fill their clients' well-defined positions — whereas employment agencies find positions for job seekers.

The big difference, Peter explains, is the networking approach The Search Firm takes. In talking with candidates, he gains a greater understanding of the types of professionals currently in the job market — and whether they match the needs of other Search Firm clients. And to reach these professionals, he turns to *Computerworld*.

"We're looking for name recognition in the computer community. It's that simple, for the most part. We really don't advertise specific positions — just our company and our specialized services.

"And we're particular about where we advertise. Computerworld *gives us the audience that's perfect for us. We're reaching all kinds of computer professionals at companies of all sizes in just about every industry. Obviously, if you're a professional recruiter, that's just what the doctor ordered.*

"Results? Put it this way: Computerworld *is the only place we advertise. And that's a decision that keeps looking better every day. Awhile back we experimented with advertising in other publications — an experiment that proved* Computerworld *is the only vehicle for us. So for the future, I see no reason to do anything but advertise regularly in* Computerworld."

Computerworld. We're helping serious employers and qualified information systems, communications and PC professionals get together in the computer community. Every week. Just ask Peter Jozwik. For all the facts on how *Computerworld* can put you in touch with qualified personnel, call your local *Computerworld* Recruitment Advertising Sales Representative today.

COMPUTERWORLD

The weekly newspaper of record for computer professionals.

Boston: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171
(508) 879-0700

New York: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652
(201) 967-1350

Washington D.C.: 8304 Professional Hill Drive, Fairfax, VA 22031
(703) 573-4115

Chicago: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018
(312) 827-4433

Los Angeles: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714
(714) 250-0164

San Francisco: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714
(415) 322-3314

An IDG Communications Newspaper

At Tandem, You Can Make A Difference

Tandem Computers is a world leader in computer systems and networks for on-line transaction processing (OLTP). Because we are setting the pace in OLTP technology, we offer software professionals the opportunity to make a difference not only within Tandem, but across the entire OLTP industry—in product innovation, quality, price/performance, and customer satisfaction.

Here, you'll help develop the future of OLTP. As a Fortune 500 company with over a billion dollars in revenues, Tandem is investing in many of the newest, most exciting technologies in the industry. In the past year, we have also acquired new businesses which have allowed us to strategically increase our capabilities in the areas of networking and systems security. Consider these opportunities located in Silicon Valley, CA!

MANUFACTURING TECHNOLOGY DEVELOPMENT

We are looking for Senior Software Developers with a minimum of 5–8 years experience in one or more of the following areas:

- Software Design Engineer—Test Systems Development
- ATE Test Systems Engineer

For the above positions, please call or send resume to: Fred Talcott, (408) 725-5588, Tandem Computers Incorporated, 19333 Vallco Parkway, MS 1-18, Cupertino, CA 95014-2599.

SYSTEMS SOFTWARE DEVELOPMENT

We are looking for Software Developers with a minimum of 3–5 years experience in one or more of the following areas:

- Operating Systems Developers—Low level, 68000 Assembly
- Console System/Subsystem Developers
- Disk Subsystem Device Driver Developers
- Large System Diagnostics Developers
- I/O Channel Diagnostics Developers
- Operating Systems QA Manager & Developers
- Computer Systems Performance Modeler

For the above positions, please call or send resume to: Melinda Rowe, (408) 285-0115, Tandem Computers Incorporated, 10600 Ridgeview Court, MS 229-17, Cupertino, CA 95014-2599.

OLTP DEVELOPMENT/QUALITY ASSURANCE

We are looking for Software Developers with a minimum of 3–5 years experience in one or more of the following areas:

- Operating Systems Developers
  —Secure/Trusted Systems
  —Kernel Level–Process Control/Memory Management
- Transaction Processing Developers
  —File/Disk management
- Database Developers/Managers—SQL/4GL
  —NonStop SQL
- Performance Measurement & Analysis
  —Software/Hardware
- Languages & Tools Developers
  —C, TAL, Ada, Pascal, FORTRAN
  —Linkers/Loaders/Binders/Debuggers

For the above positions, please call or send resume to: Martin Foster, (408) 285-0106, Tandem Computers Incorporated, 10600 Ridgeview Court, MS 229-17, Cupertino, CA 95014-2599.

DATACOMM SOFTWARE DEVELOPMENT & QUALITY ASSURANCE

We are looking for Software Developers with a minimum of 3–5 years experience in one or more of the following areas:

- SNA/LU 6.2
- OSI/MAP
- X.25
- TCP/IP
- LAN/WAN
- X.400
- Nerwork Diagnostics/Development Tools
- Telecomm/ISDN Access Methods

SOFTWARE TECHNICAL WRITERS

We are looking for talented Software Technical Writers with a BS/MS (or equivalent), a strong technical background, and a minimum of 3 years experience in writing in-depth programming level documentation for the following areas:

- Datacomm—X.400/X.25/SNA/OSI/MAP
- Database—SQL/4GL
- System/Operations

For the above positions, please call or send resume to: Bob Bachtold, (408) 285-0108, Tandem Computers Incorporated, 10600 Ridgeview Court, MS 229-17, Cupertino, CA 95014-2599.

HARDWARE DEVELOPMENT

We are looking for Hardware Developers with 3–5 years experience.

VLSI

- Associate Design Engineer
- VLSI Admin./Technical Staff
- Design Engineer
- Engineering Section Manager
- Project Design Engineer

PROCESSOR MEMORY

- Project Design Engineer
- Engineering Technician
- Associate Design Engineer

STORAGE PRODUCTS

- I/O Architect
- SCSI-Based Product Developer
- Logic Designer
- Manager of Tape Product Development

DATACOMM

- Engineering Section Manager

OPERATIONS

- Technical Staff Assistant Measurement Specialist

For the above positions, please call or send resume to: Penny Conroy, (408) 285-0110, Tandem Computers Incorporated, 10600 Ridgeview Court, MS 229-17, Cupertino, CA 95014-2599.

Individual development is promoted through a wide spectrum of resources and rewards, like ongoing training, a creativity awards program, performance-based compensation plans, and a sophisticated employee communications system that includes video teleconferencing and worldwide electronic mail. Please call or send resume to the appropriate individual/address listed above. TANDEM COMPUTERS INCORPORATED. We are an equal opportunity employer m/f/h/v. Principals only, please.

TANDEM
Where outstanding people develop together.

IMS/DB2

Applications Development
Programmer Analysts
Systems Analysts
Project Leaders
Data Base Analysts
Department Managers

Systems Programming

MVS/XA Systems Programmers
IMS and DB2 Systems Programmers
CICS Systems Programmers
VTAM/NCP Systems Programmers
VM Systems Programmers
DOS/VSE Systems Programmers

CREST COMPUTER CAREERS
4067 Hardwick St., Suite 142
Lakewood, CA 90712
(213) 403-1270

CONSULTING
IMMEDIATE OPPORTUNITIES

[illegible]

COMSYS
Attn: CW
4 Research Place, #100
Rockville, MD 20850

To Submit Resume on Floppy (5 ¼"), Call Recruiter for Compatible WP Pkgs. or ASCII File. Include SASE for Return.

EOE/M/F/V/V

SYSTEMS ENGINEER

Analyze clients' data processing requirements to determine specific system functions and capabilities, and participate directly in designing and developing those systems using Data Flow Diagraming technique. Develop test plans and perform testing to ensure integrity of systems. Use 4 GL, C and Cobol to develop and design data base programs on micro and mainframe systems. Apply knowledge of SQL in working with DB2 systems. Working with OS/MVS and UNIX-like operating systems. Requires a Master Degree in Computer Science. Graduate study should include a course in which Data Flow Diagram techniques were taught and one course in SQL language or one course in which SQL language was taught. Requires 6 months direct experience or 6 months experience as a software engineer. Basic salary $15.23 per hour and $22.85 per hour overtime. 40 Hrs. per week and 2.5 Hrs. per week overtime, 8:30 A.M. to 5:00 P.M., M-F. Send resume to: Illinois Department of Employment Security, 401 S. State Street - 3 South, Chicago, IL 60605, Attn: L. Donegan, Ref # 6943-D. An Employer Paid Ad.

RSVP SERVICES

• ANALYSTS • PROGRAMMERS
SOFTWARE/HARDWARE

Multiply Your Opportunities

With a network of over 1000 client companies and 200 affiliate employment agents nationwide, RSVP can selectively communicate your credentials to companies offering literally hundreds of choice, current career opportunities, clear across the nation.

We guide, You decide

Our no-obligation, no-pressure employment services to degreed, experienced U.S. citizens and permanent residents include resume development and interview arrangement. If you qualify, call Howard Levin or Maureen McCue at 800-222-0153, or send your resume to either address listed below by mail, or to FAX #609-667-2606. Our client companies pay all costs.

RSVP SERVICES
[illegible] Cherry Hill Mall, Ste. [illegible], Dept. C, Cherry Hill, NJ [illegible]
[illegible] Rd., Suite 201, Dept. C, 1777 Walton Rd. [illegible], PA 19422 (Mail address only)
Member Firm
computer/net
National placement network

Programmer - Analyst: 40 hrs/wk; [illegible]; overtime as needed, compensated at $[illegible]/hr. Job requires masters degree in computer science. Job also requires: 1) 1 grad course in which relational and hierarchical data bases were studied and 2) 1 grad course in data structures. Job duties: Under supervision of team leader, design, develop, test and implement computer systems for manufacturing applications for various client projects. Using relational, hierarchical, or network databases, develop system to client specifications. Write COBOL applications in an IMS DB/DC environment using DB2 databases on an IBM mainframe. Qualified applicants should send resume and verification of reqs. to 7310 Woodward, RM 415, Detroit, MI 48202. Ref #[illegible]. Employer Paid Ad.

We have over 50 exclusive openings in N.Y. State for Software Engineers at all levels ranging from 35K to 100K. Requires a BSEE or BSCS (advanced degree preferred) and 2-10 yrs+ experience in Software/Systems using C/UNIX, VAX/VMS, VAX/ULTRIX, SQL, X Window System or SUN for programs in networked computer systems, particularly in areas of insurance, banking, financial and pharmaceuticals. Interviews are being conducted. Call 716-272-1817.

- Engineers 35-60K
- Project Leaders 65K
- Engineering Supervisors 70K
- Engineering Managers 80K
- Sr Engineering Managers 100K

Send resume & salary to:
Joseph Vincell
Executive Exchange
386 White Spruce Blvd.
Rochester, New York 14623

SOFTWARE DEVELOPERS

As a nationwide placement firm specializing in UNIX system developers, programmers, and software engineers, Innovative Options can help you explore positions throughout the national high tech. R&D community.

Our nationwide clientele and network of affiliates can offer challenging opportunities (without cost to you) in any of the following areas:

- UNIX/C
- VAX
- Applications or Systems Development
- Networking/Telecommunications
- Database Development

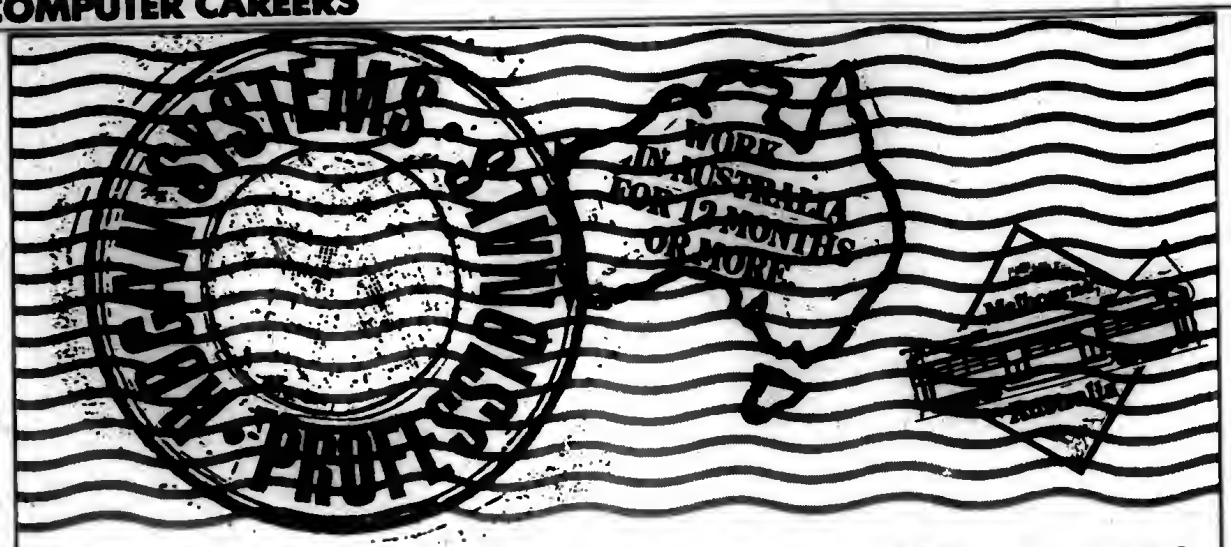
Prefer BS, MS, or PhD in Computer Science or EE. No entry level positions available. Send your resume in confidence to:

INNOVATIVE OPTIONS
[illegible]

PROJECT MGR TO $48,000

Insurance conglomerate seeks Project Mgr to manage programming team of 7 analysts in the Life Systems group. Candidate will possess good life systems bkgd. in IBM mainframe shop where your minimum in Mgt. You must be a team player! CALL DICK OZMENT

[illegible]
OF DALLAS
[illegible]
Dallas, Texas 75[illegible]
(214) [illegible]



Are you available immediately for a 12 to 24 month assignment in Melbourne, Australia?

The ANZ Banking Group is one of Australia's largest financial institutions and is recognised as a leader in banking systems technology both in Australia and internationally.

The Hogan Banking Package has been adopted as the global core banking system and the Group now urgently requires suitably qualified and experienced Hogan Banking Systems Professionals to assist in the implementation of this major initiative.

We'd like to hear from genuine prospective personnel who are prepared to spend a minimum of twelve months or more working on this project at the bank's Melbourne headquarters. We require a minimum of four years "hands on" Hogan experience and in addition would welcome personnel whose skills include UMBRELLA, CIS, DDA/TDA, LOANS. All applications from Programmers through to System Analysts and Project Managers will be considered.

A return economy airfare will be provided by the Group together with two weeks "settling in" accommodation. Visa formalities will be expedited through our personnel department.

Interviews will be conducted at several strategic centres throughout the U.S. during the two weeks commencing February 6th, 1989. Detailed resumes of all interested applicants must be submitted to the U.S. address below no later than January 20, 1989. Home telephone numbers should be included in the information forwarded together with any relevant personal details to assist us in evaluating your suitability and to arrange interviews with you in the U.S. All applications will be acknowledged.

Melbourne is Australia's leading financial city and offers a lifestyle second to none in this fabulous sunburnt country.

With a population of 3.5 million, Melbourne is regarded as Sydney's more elegant and sophisticated sister and is to Sydney what San Francisco is to Los Angeles. The city has magnificent sporting facilities to satisfy the most avid sports person and has an international reputation rivalling Paris for its restaurants and bistros. The weather is Mediterranean with average yearly temperature of around 70°F. Australians are extremely outgoing and friendly and enjoy a quality of life comparable to the best in the world.

Why not spend some time with us? Send your detailed Curriculum Vitae and accompanying personal letter to: Mr. John Stapleton, Regional General Manager, Administration and Operations, ANZ Bank, 7th Floor 120 Wall Street, N.Y., N.Y. 10005. Tel. (212) 820 9600.

ANZ Bank is an Equal Opportunity Employer

ANZ Bank

Sandia National Laboratories

MIS ANALYSTS/ PROGRAMMERS

The Information Systems Department is the central MIS organization for Sandia National Laboratories. This department develops major data processing systems in the areas of finance, personnel, assets management and procurement. A support group of data base administrators is maintained. Applications development utilizes structured project management techniques. Cobol, DB2, CSP, CICS, MVS, IBM 3090 Mainframe and distributed IBM computers.

Positions also exist in the several information centers which directly service end-user computer needs. Employment qualifications, functions performed and hardware/software used are similar to those of the Information Systems Department.

Candidates must be competent in the entire range of MIS activities and demonstrate the ability to communicate effectively with users and all levels of management. Due to the wide range and depth of activity involved, candidates must have demonstrated high academic achievement in the upper 10% of graduating class. A Master's degree from an accredited university with a concentration in MIS is required.

Sandia National Laboratories offers careers where the rewards equal the challenge. As one of the nation's largest research and engineering facilities, Sandia is an innovative force in the fields of national security R&D and energy. Sandia's benefit package includes paid health care, life insurance, retirement and 24 days vacation.

If you are interested in this opportunity, please send your resume to: **Michael Sluster, Staff Recruiting and Employment Division, 3531-82, Sandia National Laboratories, Albuquerque, NM 87185.**

EQUAL OPPORTUNITY EMPLOYER M/F/V/H
U. S. CITIZENSHIP REQUIRED

PROGRAMMERS

Trident Computer Services, a nationwide Technical Services Company, is hiring NOW through Jan. 30th, for Permanent positions at a Mid-Atlantic location.

Skill Sets: Unisys (Sperry) 1100, COBOL, DMS, TIP.

Experience 1-3 years. Salary $25-$28K/yr Relocation bonus: up to $2000.

Call Bill Haley at 1-800-344-4827 or send your resume at once to Trident Computer Services, 33 Boston Post Road West, Ste. 250, Marlboro, MA 01752.

TRIDENT
(TRIDENT TECHNICAL SERVICES INC.)

COMPUTER SYSTEMS ANALYST II
JOB ANNUM-4545
$31,476-$34,702

Position available with the Wastewater Treatment Division, Dept. of Public Works. Monitors and operates the Coordinated Control, Monitoring and Alarm System (COMAS) and the Data Collection and Reporting Computer (DCRC). Writes programs using Fortran 77, Assembly, and Advanced Basic computer languages. Develops and redesigns programs. Develops and implements test procedures. Reqs: Bach. education and experience at a bachelor's degree in computer science or a related field and one year at specialized writing computer process control instrumentation.

Apply by January 27, 1989.

Fairfax County application form is required. For information and application, call or write to:

FAIRFAX COUNTY
OFFICE OF PERSONNEL
4103 CHAIN BRIDGE RD.
FAIRFAX, VA 22030
(703) 385-1HRE

AN EOE/AA EMPLOYER

ACP/TPF Programmers Can we talk?

ACP/TPF Programmers, we can if you are an IBM Assembler or SABRETALK programmer. We can talk about how two of the nation's most successful airlines - TWA and Northwest - merged their computerized reservation systems. We can talk about the resulting dynamic company called PARS Service (Programmed Airline Reservation System) that uses IBM 9020 super computers handling maximum capacity instructions - nearly 100 million per second...and how recently PARS joined with the GEMINI system of Air Canada and Canadian Airlines to form the largest multi-hosted CRS system in the world.

Then we can talk about how you can join this exciting team that is going places. In addition to providing automation services to the two airlines, our company also develops and enhances products for the travel agency industry. The future is wide open for us — and for you.

Take off professionally and personally with our competitive salaries and comprehensive benefits, including:

- Worldwide travel privileges
- Professional/technical training
- Hiring bonus
- Non-contributory health insurance
- Relocation expenses

You can live in Kansas City, one of the most charming and affordable cities in America, ranked 16th in per capita income and 12th in educational achievement.

Want to know more about PARS Service and how we can offer you a world of opportunities? Give us the chance. Send your resume to:

Staffing Department
PARS Service Partnership
P.O. Box 20046
Kansas City, MO 64195
1-800-633-PARS
Ask for Extension PARS

Equal Opportunity Employer

A strategic plan for the 1990s

The role of MIS will call for well-defined professional development aims

BY LAWRENCE K. GRODMAN
SPECIAL TO CW

As we approach the 1990s, with computers and communications woven tightly into the organizational fabric and people costs exceeding 85% of most information systems budgets, it is clear that enterprises must introduce another layer of strategic planning. This layer relates to the ongoing professional development of the MIS staff and managers.

Two aspects of the planning are essential. First, education and training specialists should understand the growing importance of their roles. They should learn to view themselves and their responsibilities in a different light as agents of change and developers of minds.

Training and education traditionally have been viewed as a fifth wheel or, at best, an add-on in all but the most progressive enterprises. Professional development must be viewed as an essential MIS activity.

Second, the formulation and annual update of the strategic plan for MIS professional development must be consistent with the strategic plans of both the enterprise and MIS.

Paul Strassmann, former vice-president of information systems at Xerox Corp., has said, "You must consider the strategy before you design the structure." This observation applies to professional development organizations and to enterprises themselves.

In formulating a strategic plan for MIS professional development, one must start with a mission statement for the organization. This statement is a prerequisite for the development of plans at three levels: strategic, tactical and operational.

At each level, one must identify issues and objectives before defining the elements of the plan. In this top-down model, the plan elements at the strategic and tactical levels drive formulation at the lower levels.

How it might be

For example, a strategic issue might be "user involvement in systems development," leading to the strategic objective of defining and encouraging more user involvement. This objective could in turn generate plan elements such as understanding benefits and tradeoffs of user involvement, classifying users with respect to needs and educating users in applications development.

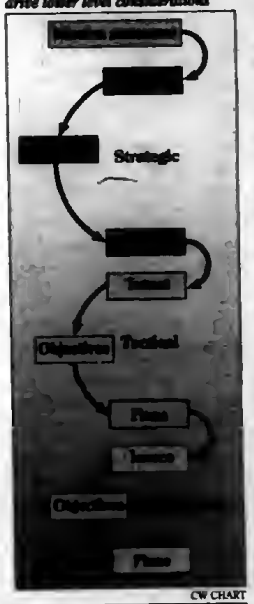
On the tactical level, the corresponding issue might be "to define user involvement that reflects the systems development approach and a user's needs." The tactical objective might be to outline procedures that foster greater user involvement. The tactical plan elements then might include defining new user responsibilities, assessing education and training needs and identifying solutions to communication problems between users and MIS.

On the operational level, the issue may be "to develop procedures for new and increased user involvement," leading to the objective of formulating tasks, priorities, budgets and resources. The elements of the operational plan might be specifying knowledge and skill requirements, acquiring reference materials, conducting work sessions with user and IS managers and formulating a training budget for users.

In forming and updating a professional development plan, managers must understand the intended audience. They also should be involved in the creation of the MIS strategic plan, because people are at least as important to that plan as hardware and software and certainly far more expensive.

Levels of planning

The mission statement and high-level issues, objectives and plans drive lower level considerations



CW CHART

Indeed, the MIS plan, and ideally the enterprisewide plan, should be regarded as a feedback loop — that is, human resources should be part of the MIS plan and the MIS plan must feed the professional development strategic plan.

A strategic plan for MIS professional development should help ingrain into the organization such relevant education and training issues as cost-benefit analysis, the roles of various media, management development practices and the need to sell professional development to management.

A professional development plan should also reflect an understanding of the technical environment as well as management needs. The latter could include the direction and priorities of the organization, competition, budgets, recruitment and the roles of information and MIS.

The plan should also reflect the need for interpersonal skills in areas such as instruction of adults, communicating with users and management of changes.

Organizations must undertake rigorous planning that reflects the growing importance of information systems in corporate and government organizations, the dependence of those information systems on people and the high cost of people.

Grodman is president of QED Information Sciences, Inc. in Wellesley, Mass.

1989 Computerworld Editorial Contents

1/9 - Executive Report: MIS in Education
1/16 - Product Spotlight: Corporate Electronic Publishing
1/23 - Executive Report: Restructuring MIS - The Data Center
1/30 - Product Spotlight: Micro-to-Host Links
*2/6 - Special Report: Communications Innovations
2/13 - Special Report: Recruitment
Product Spotlight: Performance Management Tools
2/20 - Executive Report: Strategic Planning
*2/27 - Product Spotlight: Relational DBMS
*3/6 - Special Report: Systems Integration
Executive Report: MIS in the Federal Government
3/13 - Product Spotlight: Disaster Prevention & Recovery
3/20 - Executive Report: Human Resource Development
3/27 - Product Spotlight: CASE Products
*4/3 - Executive Report: Cost Control & Justification
4/10 - Product Spotlight: PC's & Compatibles
4/17 - Executive Report: Restructuring MIS - Distributing Resources
4/24 - Executive Report: Managing after a Merger
5/1 - Product Spotlight: Network Management Tools
5/8 - Executive Report: Automating the Data Center
5/15 - Product Spotlight: Manufacturing Technology
5/22 - Executive Report: Business Executive Assess MIS
5/29 - Product Spotlight: Printers & Plotters

* Indicates Show Distribution

COMPUTERWORLD
MARKETPLACE PAGES
Where all computer buyers and sellers can go to market.

The best workbooks are also the most cost-effective:
FastDoc™
for PCs and MACs
▲ Customize workbooks for Lotus 1-2-3, Excel, WordPerfect & 16 other leading programs
▲ Produce as many workbooks as you need at no extra cost
▲ Stored as Pagemaker templates—easy to use
▲ Favorably reviewed as "simple but shrewd" and "most promising"
Phone today for your free DemoDoc
1-800-441-5441
KDA Software, Inc.
315 E. Third Street, P.O. Box 1163, Centralia, IL 62801

You Have 10 Ways To Advertise Your Products In The Classified *MARKETPLACE*
Featuring:
☐ Used/Lease/Rent
☐ Hardware
☐ Software
☐ Communications
☐ Peripherals/Supplies
☐ Time/Services
☐ Graphics/Desktop Publishing
☐ Bids/Proposals/Real Estate
☐ Business Opportunities
☐ Training

Are you up to the Challenge?

Apple Computer is looking for Systems Engineers and Technical Customer Service Managers who can rise to the challenge of selling, enhancing and maintaining Macintosh-based network systems for businesses of all sizes.

If you have a solid technical background, extraordinary presentation and selling skills, and the strong desire to participate in the leading edge of technology as it is being implemented, send us your resume. Then the next challenge will be doing your best work in a company that lets you.

Systems Engineers

You will: Provide technical support to our sales staff during the sales process; identify hardware/software technical requirements for our customers; stay on top of current product and application trends and be able to keep others abreast of those trends, effectively present systems solutions to potential customers and be able to support your decisions in a convincing way. You need: A clear understanding of current technology and applications; the ability to communicate specific benefits of systems solutions to technical or non-technical people; excellent communications skills in general; a working knowledge of Macintosh and one or more of the following system configurations: MS-DOS, DEC, IBM, UNIX; experience with networks such as SNA, DECNET, Novell and Ethernet strongly preferred; 4 years of related technical support experience, preferably in a sales environment; BSEE/CS or equivalent.

Positions available in Chicago, Minneapolis, Detroit, Milwaukee, St. Louis. Send your resume to: APPLE COMPUTER, INC., Human Resources, DB101CW, 8400 Normandale Lake Blvd., Suite 250, Minneapolis, MN 55437. Principals only, please.

Positions available in Oklahoma, Dallas, Houston, New Orleans and Arkansas. Send your resume to: APPLE COMPUTER, INC., Human Resources, Dept. SE II, 12770 Merit Drive, Dallas, TX 75251. Principals only, please.

Technical Customer Service Managers

You will: Enhance the technical capabilities of our service providers; provide high-level technical expertise to troubleshoot hardware/software problems in multi-vendor environments; consult with dealers to maintain service programs which ensure customer satisfaction; work with sales reps and dealers to enhance our post-sale service capabilities and maintain a good image; ensure the implementation and compliance of technical service programs; resolve technical service problems; provide technical and advanced service training for dealer orgainizations, especially on new product introductions. You need: 5 - 7 years' experience in data communication or networking environments; working knowledge of hardware repair and troubleshooting; demonstrated excellence in customer relations, presentations and communications in general; BSEE, engineering technologies or equivalent experience. You must be able to travel frequently within a multi-state territory.

Positions available in Chicago and St. Louis. Send your resume to: APPLE COMPUTER, INC., Human Resources, PJ101CW, 6133 North River Road, Rosemont IL, 60018. Principals only, please.

Apple computer has a corporate commitment to the principle of diversity. In that spirit, we welcome applications from all individuals including women, minorities and disabled individuals. ©1989 Apple Computer, Inc. Apple, the Apple logo, and Macintosh are registered trademarks of Apple Computer, Inc. UNIX is a trademark of AT&T.

The power to be your best.™

There's never been a better time to join us.

Systemhouse is one of the largest and fastest growing systems integrators in the industry. By applying leading technologies to information problems, we've delivered some of the most complex and successful systems solutions to our clients.

Our dynamic growth has created immediate opportunities for experienced and highly motivated professionals in the following areas:

SYSTEMS ARCHITECTS
TECHNICAL ANALYSTS
SYSTEMS ANALYSTS
SR. SYSTEMS ANALYSTS
PROGRAMMER ANALYSTS
SR. PROGRAMMER ANALYSTS
PROGRAMMERS

Requirements include a minimum of 1 year experience in one or more of the following:

IBM Mainframe — TANDEM

Also required is experience in one or more of the following:

DB2 — PATHWAY
CICS — TAL
NATURAL 2 — SQL
COBOL

Relocation and travel are required for all positions.

We offer a highly competitive compensation package including an extensive benefits plan.

For immediate consideration and to arrange an interview, send your résumé in confidence to: **Peg Gamse, Systemhouse, National Systems, Department CW-102, 1010 North Glebe Road, Arlington, VA 22201.** An Equal Opportunity Employer M/F/H/V.

SYSTEMHOUSE

Software Design & Development, Inc.
The UNIX® Specialists

Software Engineers
*We Need Your Experience**

Unix/C
VMS/C
Telephony and Database

Call or send Resume for immediate response

454 South Anderson Rd
BTC Suite 120
Rock Hill, SC 29730
1-800-634-8086

*3 years minimum experience

DP PROFESSIONALS

Positions available in Southeast and Nationwide.

Competitive Salaries

- IBM CICS, DB2 COBOL
- IBM IMS DB/DC, FOCUS
- IDMS, ADSO
- ADR IDEAL
- SAS, MODEL 204, PL/1
- ADABAS/NATURAL
- ORACLE
- RPG III, SYS 38
- VAX/VMS, C, COBOL
- PC COBOL/DBASE
- TANDEM P/A's
- HOGAN TDA/DDA/MLS
- FLORIDA SOFTWARE
- FOCUS/RAMIS
- BURROUGHS, GEMCOS
- MSA
- PACBASE/IMS

INFORMATION MGT. INC.
1 CORPORATE DR. SUITE 325
CLEARWATER, FL 34622
1-800-826-1117
1-813-577-1728

TPF Analyst. 40 hours/week, 8:00 a.m. - 4:15 p.m. $815.38/week. Will perform TPF (Transaction Process Facility) application programming techniques on IBM mainframe in Assembly language. Duties include the coding, testing and design of data structure using a hierarchical database. Masters of Science in Computer Science required. Six months experience as TPF Analyst required. Graduate education must include one semester research in the area of analysis of hierarchical database efficiency. Chicago Loop. Send resumes to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY 401 S. State Street, 3-South, Chicago, IL 60605, Attention: L. Donegan, Reference No. 6846-D. AN EMPLOYER PAID AD.

Technical Professionals...

If you are seeking a positive environment and stable, controlled growth, come to Candle Corporation, the world's leading independent developer of performance management software for IBM Mainframes. We are currently seeking top professionals in the following areas:

PRODUCT MANAGERS - Will develop product direction and strategies for a product line by directing market research activities. Previous knowledge of VTAM or MVS in software/computer related management preferably with IBM software systems.

INSTRUCTORS — Will design, develop and teach CICS or MVS curricula at our ed centers nationally and internationally. Requires 5 years systems experience with CICS or MVS.

SR. COMPETITIVE RESEARCH ANALYST — Will be responsible for tracking strategic positioning and direction of major competitors including product technical comparisons. Requires 10 years IBM industry experience with strong background in performance monitoring software.

NATIONAL ACCT. MANAGER - Will maintain overall account strategy and develop strategic relationships with major corporate customers. Requires extensive sales/marketing experience in an IBM Mainframe environment.

ACCOUNT MANAGER - Will market Candle products by phone. Requires minimum of 3 years successful sales experience selling software products (prefer IBM Mainframe).

PRODUCT REP - Direct sales of Candle products. Requires professional sales/marketing experience (major accounts), and knowledge of IBM/370 MVS & VM-based systems.

We reward innovation with excellent compensation, and extensive benefits, including profit sharing, 401 (k) plan, retirement programs, and more. Please submit your resume to:

Human Resources. Dept. TP12

Candle®
CANDLE CORPORATION
1999 Bundy Dr.
Los Angeles, CA 90025.
Equal Opportunity Employer

...Partners in Solutions—Candle and You

Research Staff Member (Westchester County) - Cndt rsrch & devlpmnt on programming languages that are based on the paradigms on constraint solving & logic programming. Languages will be based on theory of Constraint Logic Programming & will provide essential tools for Artificial Intelligence & Operations Research. Supervise 2 programmers. PhD in Comp Sci & 1 yr in job or 1 yr as Rsrchr in programming language design req'd. 1 yr exp must incld exp in theory of logic programming & algorithm design & compiler construction techniques. Must possess creative ability to cndct original rsrch as demonstrated by publications &/or presentations. Rsrch exp may be obtained at grad or post-doc level. 40 hrs/wk; 8:30 am - 5:12 pm; $62,000/yr; EOE. Send resume or letter only, IN DUPLICATE, describing qualifications to: RG #455, Room 501, One Main St., Brooklyn, NY 11201.

Recruit qualified computer and communications professionals with the IDG Communications Computer Careers Network of eight leading computer newspapers.

Call
Lisa McGrath at:
(800) 343-6474
for more details.

ADABAS DBA's

Exp'd. ADABAS DBA's. Both PERMANENT and CONTRACTUAL pos. Permanent to $65,000. Contractual to $65/hr.

These positions won't last long!

Call ASAP

ADEPT, Inc.
36 Washington Street
Suite 310
Wellesley Hills, MA 02181
(617) 239-1700

Database Engineer - To partake in development of IDMS database in a consulting environment. Require Bachelor's in Computer Science or Quantative Discipline and 3 years experience including Database Analysis Techniques, Database Design and Networking, Recovery and Control Methods, IDMS DB/DC, MVS/XA and ADSO. Salary $39,000 per annum. Job Location: Los Angeles, CA. Resume to: David M. Sturman, 16530 Ventura Blvd., Suite 205, Encino, CA 91436.

SR SYSTEMS PROGRAMMER

Sunwest Bank, New Mexico's largest financial institution, is currently offering this outstanding career opportunity in Albuquerque. Will work within a large scale IBM environment. Must have 4-8 years systems programming experience, including: MVS/SP-JES2, TSO/E, ISPF/PDF, VSAM, systems utilities, capacity and hardware configuration planning, system generation tuning and trouble shooting. Submit resume to: Employment Manager, Sunwest Bank, P.O. Box 25500, Albuquerque, NM 87125-0050. EOE M/F/H/V

Large-Scale Population of Achievers

Amdahl's professionals have world-class ability. The outstanding performance of our company and products proves this statement.

Around the world, more than 8,000 individuals are supporting and advancing Amdahl's large-scale, high performance computer systems. Their achievements have made us an undisputed leader in hardware, storage products, communication systems and software.

The caliber of our team will be incentive for you. Expectation levels will challenge you. Projects will demand new ideas, techniques and solutions. You will be in the midst of proficient people who achieve quality results in a timely fashion.

As large as we are worldwide, our teams are structured for visibility and individuality. If you expect the best from your company, your co-workers and yourself, achieve it—with Amdahl.

TECHNICAL INSTRUCTORS

Be part of our creative computing revolution by teaching clients' technical staff the fine points of using our mainframe systems. As an instructor you will teach classes at Amdahl Education Centers in the U.S. and Worldwide. Opportunities include:

UTS*/UNIX® Instructor** Strong C Shell programming, installation tools, 370/XA architecture (preferred)

Communications Instructor TCP/IP, NFS, SNA, RFS, Network tuning

VM Instructor Large systems experience, CMS background

Please call Barbara Kvek at (800) 538-8460, extension 6653, or send your resume to her at Mail Stop 300.

COMPUTER DEVELOPMENT

With our CPU on-a-board design, all central processing unit functions reside on a single board. This new level of integration provides faster performance by limiting instruction path lengths. You can be a part of this dynamic state-of-the-art development organization in one of the following positions:

CPU Design Engineers
Hardware Design Engineers
Digital Design Engineers
I/O Design Engineers
Console Design Engineers
System Failure Analysis Engineers

Please call Deborah Brown at (800) 538-8460, extension 7686, or send your resume to her at Mail Stop 300.

TECHNICAL WRITERS

Accept the challenge of our expanding Technical Publications Department by writing software manuals for our newest product lines. You will need 5+ years technical writing experience and knowledge of one of the following areas:

UNIX (UTS)
Data Communications
MVS/VM

BSCS or equivalent experience required.

Please call Bob Swires at (800) 538-8460, extension 6399, or send your resume to him at Mail Stop 300.

CORPORATE INFORMATION SYSTEMS

Contribute to our exciting IDMS development efforts. We need MIS professionals whose backgrounds include 3+ years experience in IDMS/ADSO maintenance and development. FOCUS and SAS experience is a plus. A BSCS or equivalent experience is desirable.

Programmers
Programmer Analysts
Database Analysts and Administrators

Please call Bob Swires at (800) 538-8460, extension 6399, or send your resume to him at Mail Stop 300.

CORPORATE MARKETING

Be the key player in taking our products to market. Responsibilities span from the initial evaluation/definition of markets and specification of product features through to the final delivery of products to their respective marketplace.

Product Marketing Manager Storage Systems
Product Marketing Manager Supercomputers

Please call Doug Jones at (800) 538-8460, extension 6906, or send your resume to him at Mail Stop 300.

PERFORMANCE ANALYSIS

Influence the performance of Amdahl's mainframe computers. Use your expertise in 370 architecture, mainframe operating systems and computer modeling to evaluate and enhance the performance of current and future processors. Opportunities include:

Workload Development
Analysis Tools
Peripheral Performance (DASD)
Modeling

Please call Bonna Kauffman at (800) 538-8460, extension 6167, or send your resume to her at Mail Stop 300.

CORPORATE COMPUTER CENTER

Be the first to utilize our newest products and first to share major technological advances. Within our Corporate Computer Center, which is one of the largest on the West Coast, you'll be in strategic partnership with our product development and marketing teams. Your experience and expertise in one of the following areas will make you a valuable contributor to our team

Senior UTS/UNIX Administrator

Voice Data Communications

Senior Communications Systems Engineer
LAN Ethernet, IBM Token Ring, CAD/CAE Experience

Senior Systems Programmers
ACF/VTAM, ACF NCP, Netview Netmaster, SNA

Senior Telecommunications Engineer
Voice/Data Network Design & Integration, Network Management Strategies

Please call Barbara Kvek at (800) 538-8460, extension 6653, or send your resume to her at Mail Stop 300.

OPERATING SYSTEMS DEVELOPMENT

Be involved at the System Control Program level in the development of important enhancements to Amdahl's architectural advantages, such as MDF and our enhanced instruction pipeline. Positions include:

VM Systems Software Developer
370/Assembler Compatibility Software Developer
Channel Programming Specialist
Macrocode Developer
Staff Systems Software Programmer

Please call Susan Raskin at (800) 538-8460, extension 6191, or send your resume to her at Mail Stop 300.

One of the best benefits Amdahl provides you is our full support and commitment. Accordingly, our competitive salaries and comprehensive benefits program are first-class.

Send your resume to Amdahl Corporation, Employment Department 1-4, P.O. Box 3470, Mail Stop 300, Sunnyvale, California 94088-3470. Principals only, please.

*UTS is a registered trademark of Amdahl Corporation
**UNIX® is a registered trademark of AT&T Bell Laboratories.

amdahl
Expect The Best

There is no Substitute for Talent.

Talent is more than natural ability. It is a combination of inherent aptitude, motivation, discipline and follow through. It is an attitude.

Talented employees deliver results, give you confidence and peace of mind. CompuSearch Account Executives can deliver these accomplished people to serve you, because finding talent is our talent.

To see what a difference our winning attitude makes, contact Marc Blessing, National CompuSearch Director, at (800) 321-2309. He'll tell you how to get in touch with the CompuSearch talent specialist nearest you. In Ohio, just call (216) 696-1122.

CompuSearch®
A DIVISION OF MANAGEMENT RECRUITERS

MVS SYSTEMS SOFTWARE DEVELOPERS

You developed the software. You should have a say in the marketing... and earn commissions.

No one knows more about a systems software product than the professionals who developed it. That's why software developers at Goal Systems don't stop with design, programming, test, and support — they go on to work with our marketing staff, managing product promotion. They see the results in dollars and cents: software developers earn product royalties at Goal Systems, and our sales have grown 500% in just four years.

We're increasing the size of our development staff. Beginning in February and continuing throughout 1989, we have opportunities for experienced developers of IBM mainframe/compatible MVS systems software who have written 30k-plus lines of 370 Assembler code. These positions require excellent communication skills for contact with customers as well as internal staff.

We are located in Columbus——Ohio's capital city which provides outstanding medical and educational resources, Big Ten sports, affordable housing and diverse cultural and recreational activities. Besides our very competitive base salaries and royalties, our compensation package includes medical/dental/vision coverage, life and long-term disability insurance, profit sharing, tax-deferred savings programs and an attractive relocation program. Please send us your resume and salary history: **GOAL SYSTEMS INTERNATIONAL, INC., Human Resources Department - C.W., 7965 N. High Street, Columbus, OH 43235.** An Equal Opportunity Employer M/F/H/V.

Goal Systems
Software Solutions

Data Processing

Only highly technical minds will appreciate this ad.

You know we're the world's premier air express carrier. And you've probably heard we're a people company. But did you know we're also one of the most technically advanced companies in the nation? We're offering you the opportunity to learn why.

Operations Research Analyst

In this position you will analyze broad corporate problems through the use of sophisticated computer-based models and other operations research methods, while providing Senior Management with appropriate recommendations and alternatives.

The Operations Research Analyst candidate should have at least a Bachelor's degree in Operations Research or its equivalent. Two years professional experience in Operations Research is required. You must be proficient in FORTRAN, PL/1 or PASCAL programming languages. Strong communication and analytical skills a plus.

Scientific Programmer

This individual will perform scientific and mathematical computer programming, and provide problem-solving assistance in support of research planning and analysis.

The Scientific Programmer candidate should have a Bachelor's degree in Computer Science, Operations Research or its equivalent. Knowledge of FORTRAN, PL/1 or PASCAL programming languages is required. Strong communication and analytical skills a plus.

As one of the ten best companies to work for in America, we offer an excellent salary and benefits package. For immediate consideration, please send your resume with salary history to: **FEDERAL EXPRESS CORPORATION, Attn: Joe Hinson, 2831 Airways Blvd., Memphis, TN 38132.**

You deserve the pleasure of our company.

FEDERAL EXPRESS

An Equal Opportunity Employer M/F/H/V

TPF SYSTEMS ENGINEER required. Responsible for TPF2 software design, coding, testing documentation, problem solving and program implementations on real time TPF system. Analyze, code, test and implement program fixes and enhancements. Will provide functional system support to less senior systems and software engineers. Will act as project leader or team leader for a group of 2-6 persons. Will utilize the Basic Assembler Language and the CMS Test tools.

Applicants required to have a Bachelor of Science Degree in Math, Computer Science or Engineering with at least two years experience in ACP/TPF Airline Control Programming and Analysis. Education and experience will be found acceptable if applicant has a combination of formal and informal education and work experiences found to be equivalent to a Bachelor of Science Degree in Computers in addition to two years of ACP/TPF Airline Control Analysis and Programming experience.

Annual Salary will be $54,000.00 per year for a 40 hour work week.

Interested applicants apply by resume to Division of Employment Security, Missouri Department of Labor, 1411 Main Street, Kansas City, MO 64105. Phone: (816) 472-3051. Refer to job order No. 229858. Ad Paid By An Equal Employment Opportunity Employer.

COMET Support Specialist - Confer with personnel from manufacturers/distributors/wholesalers to define specific output requirements; analyze business procedures/problems to refine data & convert to programmable form; study data handling systems, altering or developing new systems as needed; specify in detail current and projected needs of COMET facilities. Plan & prepare technical reports, memoranda & operating procedure manuals. Act as technical consultant to sales & marketing, preparing & delivering technical presentations. Design COMET application systems to unique customer requirements. Provide training in use & continued technical problem solving support. Maintains COMET software library. 40 hours/week: 8 am - 5 pm. Salary $737.60/week. Requires Bachelor's or Associate's Degree with major in Datamatics (Computer Science). Must have 2 - 3 years experience in job-related or 2 - 5 years experience in Application software support/analyst/programming. If applicant has a Bachelor's degree, only 2 years experience is required; if applicant has an Associate's degree, then 5 years experience is required. 1 year of the experience must include working with COMET (can be on-the-job training). Must be willing to travel approximately 2 - 3 days per month within the USA. Application by resume. Mail resumes to Colorado Department of Labor and Employment, 600 Grant St., Suite 900, Denver, CO 80203-3528, referring to J.O.#CO3918119.

AGS knows... building systems is serious business.

AGS, a NYNEX Company, employs 2,000 computer professionals in 33 offices throughout this country and in England. We are a national professional services company engaged in building information systems for the most recognized names in computer manufacturing, telecommunications, financial services, consumer products and government.

Computer Professionals

If you have significant experience developing applications OR systems software in an IBM mainframe or UNIX* environment, we would like to hear from you.

AGS has opportunities throughout the USA.

If you are serious about building systems, AGS may have an opportunity for you. Relocation assistance is available. Please call our toll free #, write or fax to:

AGS Information Services, Inc.
Loree Tisdale, National Recruiter
1139 Spruce Drive
Mountainside, NJ 07092

1-800-HIRE-AGS **Fax (201) 654-9794**

AGS

*UNIX is a trademark of AT&T.
An equal opportunity employer m/f/h/v.

When you compare costs and the people reached, Computerworld is the best medium for computer-related recruitment advertising.

Place your ads today!

Call toll-free 800-343-6474

In Mass (508) 879-0700

"Get on with it."

That's how we do business at Teradata.

We're a company that's on the move. And we like to get things done. Quickly. Without a lot of endless meetings and memos and review.

It has worked. We are responsible for some of the most advanced relational database management systems in the world. And if you think this kind of high-tech lead can mean a great career opportunity for you, you're right.

System Engineers

Right now, we're looking for some dynamic System Engineers in our field offices in:

Atlanta	Detroit	New York
Chicago	Houston	Orlando
Cincinnati	Los Angeles	Tulsa
Denver	New Jersey	Washington, D.C.

You will provide the information and support necessary to our clients and prospects to help sales of our products, as well as ensuring product satisfaction. This will include assisting marketing representatives in pre-sales activities, developing customer support plans, installation and demonstration of products, ongoing consultation, education, evaluation and recommendations for existing clients.

You should have a solid knowledge of database management, programming, hardware and software systems, and at least 3 years experience with MVS. Knowledge of one of the following is also desired: VM, DB2, SQL/DS, IDMS/R, Datacomm/DB, UNIX/UTS, IMS, ADABAS, and Model 204. A Bachelor's in computer science or equivalent experience is required. Vendor experience is a plus. Good communication skills and 30% travel are both expected.

This is the kind of challenging position handled best by people who are self-motivated and who like to solve problems in a fast-moving environment.

If you would like to get on with it, too, forward your resume, noting preferred location and salary history, to: Phil Barquer, Field Operations, Teradata Corporation, Dept. CW-12, 12945 Jefferson Blvd., Los Angeles, CA 90066. Equal Opportunity Employer. Principals Only Please.

Teradata

Get on with it.

Success is a lot closer than you think.

Because TRECOM is a lot closer than you think. Serving Fortune 500 clients within the communication, financial services and manufacturing/commercial industries, TRECOM is close to the top of the DP consulting industry. And as our reputation in the industry grows, our geographic locations continue to broaden. Operating out of offices in New Jersey, New York, Dallas, Kansas City, and Tampa, TRECOM has additional project sites throughout the South and Southwest.

Programmer Analysts and Systems Analysts

We are actively seeking individuals with at least two to three years' experience in any of the following:

Nationwide:
- DB2
- CICS COBOL

New York:
- VAX/INGRES
- TERKS
- System 38/RPG III
- COBOL/ASSEMBLER (OS to VM)
- SYSTEMATICS Banking Experience
- SUN Microsystems Workstation Developers
- Senior Programmer/Analysts—COBOL

Kansas City:
- COBOL, DB2, SQL (CICS a +)
- CICS ASSEMBLER
- Laser Printer Experience
- Technical Writers

Philadelphia:
- TELON
- NOMAD
- IMS COBOL/VSAM—Payroll Exp.
- IMS DB/DC COBOL—PAC BASE

Tampa:
- IMS COBOL
- CICS ASSEMBLER
- Systems Analysts w/Billing Knowledge

New Jersey:
- System 36/COBOL
- IMS PL/I or COBOL
- TELON
- Requirements Analysts/Systems Analysts
- UNIX/"C" with INFORMIX, ORACLE and/or Data Communications
- DEC VAX, "C", VAX Cluster

Washington, D.C.:
- IMS PL/I or COBOL
- TELON

Dallas:
- ADABAS/NATURAL
- IMS DB/DC COBOL DBA

Put success within your grasp. For immediate consideration, call collect or FAX your resume to the geographic area that interests you.

N.J./Phil./Wash. D.C.
(201) 549-4200
FAX (201) 549-4648

N.Y.
(212) 889-6680
FAX (212) 344-8629

K.C.
(913) 451-2317
FAX (913) 451-0907

Dallas
(214) 960-7085
FAX (214) 458-7618

Tampa
(813) 885-8982
FAX (813) 885-8909

TRECOM

Business Systems Inc.

333 Thornall Street
Edison, N.J. 08837
(Headquarters)

Equal Opportunity Employer M/F/H/V

MANAGEMENT & PROGRAMMERS

BRIDGESTONE SOFTWARE (U.S.A.), INC., with locations in Los Angeles and Nashville, is seeking well qualified managers and programmers for each of its IBM Mainframe Shops. Primary language is COBOL in an OS CICS/DL1 environment.

Manager positions require 5 years experience in similar capacity, and proven leadership and technical skills. Programmers with at least 2 years in IBM environment using 3090, 43xx Mainframes. We are also seeking individuals with System 36. AS Programming skills are also in demand. Our users work in distribution, sales, finance and marketing systems.

We offer a competitive salary and excellent benefits package. Send your resume, which MUST include your salary history, along with your location preference to:

BRIDGESTONE SOFTWARE
19701 Hamilton Avenue
Suite 160, Dept. CW
Torrance, CA 90502

We will respond to considered candidates within 3 weeks.

Equal Opportunity Employer M/F/H/V

SYS/36 - CALIF

SANTA BARBARA COTTAGE HOSPITAL, a 600-bed acute care facility, has immediate opportunities for an IBM SYSTEM/36 PROGRAMMER/ANALYST. The installation is running BAXTER hospital software on two SYS/36's (Models 600 & 700) and is planning to migrate to the AS/400. The applicant must have at least 3 years experience programming in RPG II on a SYS/36. Health care and "PC" experience would be advantageous. Salary commensurate with experience. Choice benefits, superb working environment; unmatched geographic location and a commitment to state-of-the-art technology are offered. Applications will be accepted until 1/23/89. Please send resume and salary requirements to:

HUMAN RESOURCES DEPT., 2400 Bath Street, Santa Barbara, CA 93105, (805) 569-7212. EOE.

RPG III ANALYST/PROGRAMMER

Large AS400 Installation has immediate need for sr/RPG III programming professional with very strong analytical skills. This is a state-of-the-art shop providing tremendous opportunity for career growth. If you desire an opportunity that will advance your career, call for further details. Heavy emphasis will be in new development. Salary $35,000.

ENGENIUS SERVICE
DATA PROCESSING
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1000
FAX: (314) 727-1321

West Virginia University
Assistant Vice President
Computing and Information Resources

West Virginia University invites applications and nominations for the position of Assistant Vice President for Computing and Information Resources. This land grant University has more than 18,000 students enrolled in 175 degree programs and is the state's major research university. The annual budget exceeds $30 million dollars.

RESPONSIBILITIES: The Assistant Vice President reports to the Provost and is responsible for administering academic service personnel and budgets, coordinating support services, recommending the allocation of resources; developing plans and recommending policy for academic and administrative computing, communications, and information resource management; and acting as chief liaison with statewide and national computing resource centers.

QUALIFICATIONS: Candidates for this position will be expected to possess an earned doctorate or masters degree; have held senior level administrative positions; demonstrate a proven record of accomplishment in planning, implementation and management of computing and telecommunication systems in a multifaceted environment; exhibit an understanding of academic, administrative and research computing needs; possess knowledge of computing, communication and information systems and exhibit the ability to communicate with and provide leadership for a broad range of constituencies.

SALARY: Competitive.

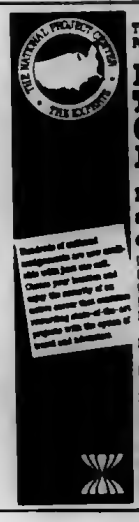
STARTING DATE: July 1, 1989 or as soon as possible after the conclusion of the selection process.

DEADLINE FOR APPLICATIONS: Accepted until the position is filled with screening beginning January 15, 1989.

APPLICATION PROCEDURE: West Virginia University is committed to affirmative action and invites nominations for and applications from women and minority candidates. Submit letter of application, curriculum vita and names, addresses and telephone numbers of three professional references to:

Dr. William E. Vafas, Chairperson
Search Committee for Assistant VP, Computing & Information Resources
306 Stewart Hall
West Virginia University
Morgantown, WV 26506

An Affirmative Action/Equal Opportunity Employer



The National Project Center
For National Contract Assignments

Put Your Skills To Work Today! Call: 1-800-777-5999

If you are an expert in any of the following areas, explore your options:

UNIX, "C", CSM	VAX, ADA
UNIX, "C", SUN MICRO	IDMS AD5/0
UNIX DEVICE DRIVERS	CULLINET (CAS/CIMS)
UNIX, "C", INFORMIX	DB2/SQL or DB2 DBA
IBM PC MICROSOFT WINDOWS	IMS DB/DC
IBM PC, "C", DEVICE DRIVERS	IMS /ADF
IBM PC, "C", INTEL ASSEMBLER	S/38 or AS/400
IBM PC, SOFTWARE TESTERS	ADABAS/NATURAL
	TECHNICAL WRITERS
	ADA PROJECT LEADER

HOT long term IBM S/38 or STRATUS projects

Thousands of national assignments are now available within just the gulf, Contact your business and enjoy the security of an outstanding state-of-the-art consulting company that specializes in projects with the experts of brand name companies.

The Experts

NATIONAL PROJECT CENTER
4401 W. Tradewinds Ave. #308
Lauderdale by the Sea, FL 33308

BALTIMORE/WASHINGTON

SMART CATS *POUNCE HERE.*

If you're an experienced DP professional on the prowl for the opportunity of a lifetime, get finicky with Chessie Computer Services, Inc.

Our new Professional Services Group is putting Baltimore & Washington business on track. We're a bunch of clever cats: consultants who can solve any DP problem. If you're frisky and rarin' to go, leap for the chance to join a team that's truly the cat's meow.

Your pedigree should include 3+ (people) years of experience and IBM expertise in:

COBOL	*DB2*
IMS DB/DC	*IDMS*
CICS	*IDEAL*
DATACOM	*"C" and more COBOL*

Here's a little catnip. We offer highly competitive salaries, comprehensive company-paid benefits, and a variety challenging work environments that will stretch your skill set. We're not talking table scraps, here!

Right now we have consulting positions for Senior Programmer Analysts, Systems Analysts, Project Leaders, and Systems Programmers in our Professional Services Group, plus similar positions available in our internal systems development organization. So, get off your tail and send your resume to:

SMART CATS
Chessie Computer Services Inc.
2244 World Trade Center
401 E. Pratt Street
Baltimore, Maryland 21202
(301) 783-8411

Chessie Computer Services, Inc.

CCSI is a unit of CSX Technology
EOE

FLORIDA

We're Software Services of Florida, providing data processing consulting services to major corporations and small companies. Our employees receive excellent benefits and salary commensurate with experience, as well as paid relocation. We are currently seeking highly professional consultants meeting any of the following qualifications:

SOFTWARE SERVICES OF FLORIDA, INC.

- COBOL, CICS, OS/JCL
- COBOL, IMS DB/DC (DB-2 & CICS +)
- PL-1, IMS DB/DC (CICS +)
- DB-2
- FOCUS, VM/CMS
- COBOL, AS-400 or SYSTEM/36
- NATURAL II, CICS
- C, ASSEMBLY, with OS/2
- RPG II or RPG III
- MODEL-204
- BASIC, PICK
- COBOL, on IBM and UNIVAC MAINFRAMES
- C, VMS, DECNET, on VAX HARDWARE
- C, UNIX, INFORMIX
- COBOL, PATHWAY (TANDEM)
- IBM/UNIVAC (SYSTEMS PROGRAMMERS)
- IBM/UNIVAC (COMMUNICATION SOFTWARE SPECIALIST)

Call toll-free National: **1-800-237-8181**
Florida only: **1-800-282-4141**

or send resume to: Cy Dougherty, Personnel Director
Paragon Crossing, Suite 124, 11300 4th St. N., St. Petersburg, FL 33716

Anatec

Start The New Year S.M.A.R.T.

When it comes to careers in systems technology, Anatec takes the S.M.A.R.T. approach. We found that both clients and employees benefit when we utilize the Synergism of Management, Analytical Resources and Technology. As a result, we can continue to provide our Fortune 500 clients with innovative solutions to their Information Processing needs.

Anatec, as one of America's fastest growing professional service companies, attracts and retains some of the industry's best professionals. We offer diversified assignments and in-field management support that offers you the opportunity to excel with leading edge technology.

If you have 2+ years' Information Processing experience and a desire to grow with a company, let's put our SMART's together. Join us as a Programmer, Programmer Analyst, Systems Analyst, Team Leader, Systems Programmer or DBA.

We require skills in: DB2, INGRES, ORACLE, SYBASE, FOCUS, POWERHOUSE, IMS, CICS, ADABASE/NATURAL, IDMS, COBOL, IBM, DEC/VAX HP3000, HONEYWELL, BURROUGHS or CAD/CAM.

Compensation is among the best in the industry with 100% company paid benefits including 401(K), tuition reimbursement and paid overtime. To apply for positions at our locations in North America and Europe, call us at (313) 540-4440 or send your resume to: **Analytical Technologies, Inc., 38300 Telegraph, Suite 200, Bloomfield, MI 48010.**

Analytical Technologies Inc.
Succeeding with technology... through people
Equal Opportunity Employer

Saudi Arabia

COMPUTER PROFESSIONALS

A National Saudi Company
Invites applications for the following positions:

Technical Support Manager:
- B.S. in Computer Science or Electronics Engineering.
- Minimum experience of 5 years in the position of Technical Support Manager in the DEC or DEC compatible equipment environment.
- Should be fluent orally.
- Ability to do Seminars and Presentations.
- Providing technical action plans when required.
- Good diagnostic and repair skills.
- Good working knowledge of VMS and RSX.
- Team leader, and responsible for all aspects of service delivery.

Systems Programmer:
- B.S. in Computer Science or Equivalent.
- Minimum of 5 years experience as system programmer, system manager in RSX-11 or operating systems.
- Knowledge of DECnet, Assembly and Macro/PDPs.
- Knowledge of VAX/VMS operating system.
- VAX/VMS System Manager.

Database Administrator:
- B.S. in Computer Science or Engineering or Mathematics.
- Minimum of 5 years experience in data processing of which at least three should be in ADABAS database administration/administration.
- Extensive knowledge of ADABAS and NATURAL.
- Technical experience in VAX/VMS.
- Technical support experience in problem determination and debugging in any DEC environment.
- Knowledge of data administration, system development methodology, electronic mail system.

Hardware Engineer:
- B.S. Electronic Engineering or equivalent.
- Minimum of 5 years experience in DEC or DEC compatible equipment.
- Experience in CPU's, Disk subsystems and other peripherals is a must.
- Knowledge of VAX/VMS, RSX, DECnet, and Cluster.
- Knowledge of DEC Communications.

Senior Operator:
- B.S. in Computer Science or related area.
- Minimum experience of 4 years in DEC environment, VAX 7xx and PDP's, in operation.
- Knowledge in operation procedures and operation management.
- Good and communication and ability for training.
- Knowledge of VAX/VMS and RSX, is desirable.
- Trouble-Shooting and problem solving.

Senior Office Automation Specialist:
- B.S. in Computer Science or related area.
- Minimum experience of 5 years in Office Automation.
- Skills in word processing and communications.
- Candidate should have experience in the DEC environment, and knowledge of how DEC interfaces with other PC's.
- Will be responsible for providing user training and technical consultation for Office Automation, hardware and software.
- Performing system analysis for the implementation of Office Automation hardware and software, systems.

A Competitive salary paid in S.R. normally free of tax, and an excellent benefits package.

Priority for Saudis.

Interested persons may send their curriculum vitae to the following:

Personnel Manager
P.O. Box 60587, Riyadh 11555
Saudi Arabia

Experienced Programmer/Analysts

CALL US...

We'll Help You Grow

M.I.S. International headquartered in Michigan with a dynamic division in Atlanta has been providing services to Fortune 500 firms including major automobile manufacturers and suppliers for over 10 years.

We are enjoying exceptional growth, making this a perfect time to step up to a permanent position on our technical staff. We're interested in Programmer/Analysts with at least 2 years of experience in the following:

- IMS DB/DC, COBOL or PL1
- CICS, COBOL
- IBM PAYROLL or HR
- COBOL TSO/ISPF
- SYS. PROG. IMS DB/DC
- UNIVAC DMS 1100, COBOL
- HONEYWELL DPS6, BCOS, COBOL
- IBM PC To Mainframe
- HP1000, FORTRAN
- HP3000, TRANSACT

For more information contact: Marie Clark, Director of National Recruiting at 1-800-521-2144 or send your resume to: M.I.S. INTERNATIONAL, Corporate Headquarters, 30200 Commerce Drive, Farmington Hills, MI 48024. Equal Opportunity Employer.

MIS INTERNATIONAL INC.

LEARDATA has been a leader in consulting services in the Southwest since 1978, and is still growing! The reason for our success?

INTEGRITY

We offer the true DP Professional challenging assignments; competitive compensation, including paid overtime; and a comprehensive benefit package. Hourly contract positions are also available.

You will need proven experience with any of these skills:

- TANDEM - Pathway, TAL or SNAX
- IMS DB/DC
- DB2/SQL
- TELON
- Relational database
- ADABAS/Natural
- ADPII
- Model 204
- Datacom DB/IDEAL
- PL/I, REXX
- SW Engin/ Networking

Call or send resume with location preference to David Bourbonnais at:

LEARDATA Info-Services, Inc.

800 N. Pearl, Suite 900, Dallas, TX 75201
214/969-7300

Offices in Dallas, Denver, Houston, Tulsa, Phoenix

MVS SYSTEMS PROGRAMMERS

The Washington State Department of Information Services (DIS) in Olympia has an opening for a senior IBM systems software support person. DIS is looking for an individual with at least 4 years of IBM S/370 systems experience with either VM, MVS/XA, or CICS. The successful candidate will be responsible for the installation and tuning of numerous MVS systems products in a multi-CPU environment. The ability to interact well with customers and co-workers is both an opportunity and a requirement. Salary $2648 - $3360/mo. commensurate with experiability. Send resume no later than January 27, 1989, to:

Jan Cabe
Personnel Manager
State of Washington
Department of Information Services
1110 S. Jefferson
Jefferson Bldg., MS: PC-11
Olympia, WA 98504
(206) 753-1903

The State of Washington is an equal opportunity employer. Women, racial and ethnic minorities, disabled persons, persons over 40 years of age, and Vietnam era veterans are encouraged to apply.

COMPUTERWORLD
SALES OFFICES
Publisher/Fritz Landmann

Vice President/Associate Publisher/Val Landi, COMPUTERWORLD, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (508) 879-0700

BOSTON: Northern Regional Director/David Peterson, District Managers/Bill Cadigan, Sherry Driscoll, John Watts, Sales Assistants/Alice Longley, Lisa Bonaccorso, Paula Wright, COMPUTERWORLD, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

CHICAGO: Eastern Regional Director/Bernie Hockswender, Midwest Regional Manager/Kevin McPherson, District Manager/Larry Craven, Sales Assistants/Kathy Sullivant, Karol Lange, COMPUTERWORLD, 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433

NEW YORK: Eastern Regional Director/Bernie Hockswender, District Managers/Fred La Sapio, Frank Genovese, Sales Assistant/Linda Pipines, COMPUTERWORLD, Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

LOS ANGELES: Western U.S. Director/Jan Harper, Southwestern Regional Manager/Carolyn Knox, District Manager/Darren K. Ford, Sales Assistant/Bev Raus, COMPUTERWORLD, 18004 Sky Park Circle, Suite 255, Irvine, CA 92714 (714) 261-1230

SAN FRANCISCO: Western U.S. Director/Jan Harper, Senior District Manager/Ernie Chamberlain, District Managers/Michele O'Connor, Alicia Sarfaelis, Sales Assistants/Chris Kobayashi, Nurit Zelman, COMPUTERWORLD, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555

ATLANTA: Eastern Regional Director/Bernie Hockswender, Southeastern Regional Manager/Kevin C. Harold, Account Manager/Melissa Christie Neighbors, Sales Assistant/Debra Brown, COMPUTERWORLD, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758

DALLAS: Eastern Regional Director/Bernie Hockswender, Southeastern Regional Manager/Kevin C. Harold, Sales Assistant/Brenda Shipman, COMPUTERWORLD, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882

WASHINGTON, D.C.: Eastern Regional Director/Bernie Hockswender, District Manager/Paula Smith, COMPUTERWORLD, Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

PRODUCT CLASSIFIED ADVERTISING: Product Classified Advertising Director/Eastern Account Manager/Debbie Eisenberg, Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

New England Account Manager/Paul Bonarrigo, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

Midwest Account Manager/Marie Hayes, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

Western Account Manager/Karen Massimino, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

RECRUITMENT ADVERTISING: National Recruitment Sales Director/John Corrigan, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES: New England Recruitment Manager/Al DeMille, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

Mid-Atlantic Recruitment Manager/Warren Kolber, Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

Midwest Recruitment Manager/Patricia Powers, O'Hare Corporate Tower One, 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (312) 827-4433

Western Recruitment Manager/Barbara Murphy, 18004 Skypark Circle, Suite 100, Irvine, CA 92714 (714) 250-0164

South-Atlantic Recruitment Manager/Kathryn Kress, 8304 Professional Hill Dr., Fairfax, VA 22031 (703) 573-4115

Recruitment Account Executives: New England/Nancy Percival, Mid-Atlantic/Jay Novack, South-Atlantic/Pauline Smith, Midwest/Ellen Casey, Western/Chris Glenn, 1-800-343-6474 or (508) 879-0700

IDG INTERNATIONAL MARKETING SERVICES: Managing Director/Frank Cutitta, COMPUTERWORLD, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

West Coast Marketing Manager/Leslie Barner, 3350 West Bayshore Road, Suite 201, Palo Alto, CA 94303 (415) 424-1001

CW PUBLISHING/INC.
An IDG Communications Company

Fritz Landmann/President

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: 508-879-0700, Telex: 95-1153, FAX: 508-875-8884

Vice President/Associate Publisher, Val Landi

OPERATIONS: Vice President/Operations, Matthew Smith. Business Manager, Mark Sullivan.

SALES: Advertising Director, Carolyn Novack. National Recruitment Sales Director, John Corrigan. Display Advertising Production Manager, Maureen Carter. Classified Operations Manager, Cynthia Delany.

MARKETING: Vice President Marketing & Circulation, Jack Edmonston. Marketing Communications Director, Jan Bell. Marketing Services Director, Audrey Shohan. Manager/Marketing Communications, Mary Doyle.

CIRCULATION: Vice President Marketing & Circulation, Jack Edmonston. Director of Circulation Management, Maureen Burke. Director of Circulation Promotion, Carol Spach.

PRODUCTION: Production Director, Leigh Hometh. Assistant Production Director, Carol Polack. Production Manager, Beverly Wolff. Art Director, Tom Monahan.

FOREIGN EDITORIAL/SALES OFFICES

[illegible]

IDG COMMUNICATIONS/INC.

[illegible]

[illegible]

ADVERTISERS INDEX

Accelerated Systems,Inc. 36
Apollo Computer 22
AT&T 32-33
B.I. Moyle & Associates 63
Candle Corporation 43
Chinon America 44
Cincom Systems 34
Command Technology Corp. 68
Computer Power Group C2
Cullinet Software 48-49
CW Circulation C3
CW House 65
Data Group 62
Dylakor/Sterling Software 72
Hewlett Packard 36-37
IBM 21
IDC 47
Informix Software Inc. 58-59
Innovation Data Processing 5
Interface Systems 64
International Power Machines 74
Micro Focus 67
Microsoft Systems 54-55
MSA C4
Novell 26-27
Oracle Corporation 11,13
PARS Service Partnership 40,42,43
Radio Shack 70
Racal 42
SAS Institute 14-15
Software Engineering of America 9
Syncsort 3
Systems Industries 40
Trax Softworks 50
Uniforum 57
VM Software 7
Wyse Technology 66

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

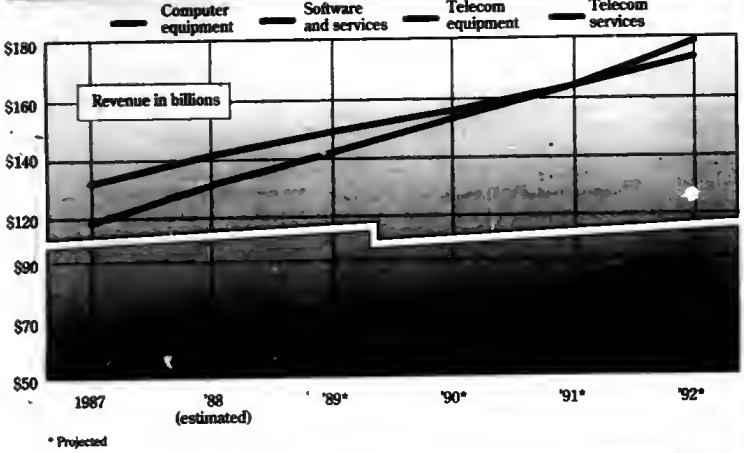
Look for These Upcoming Special Editorial Features in Computerworld

Issue Date	Executive Reports	Product Spotlights
Jan. 9	MIS in Education	
Jan. 16		Corporate Electronic Publishing
Jan. 23	Restructuring MIS — The Data Center	
Jan. 30	Special Report: Communications Innovators	
Feb. 6		Micro-to-Host Links
Feb. 13	Special Feature: Recruitment	Performance Management Tools
Feb. 20	Strategic Planning	

TRENDS

Computer industry outlook

Software and services sector should chalk up the greatest gains



Industry observers who have had little to say beyond "Bah. Humbug!" about the state of the computer sector of late may be suffering the effects of visits from the Ghost of Computer Industry Past. Recent figures compiled and issued by the Computer and Business Equipment Manufacturers Association (CBEMA) show a still-vital industry that, while slowing because of maturity, is nevertheless outstripping the gross national product and is projected to keep doing so.

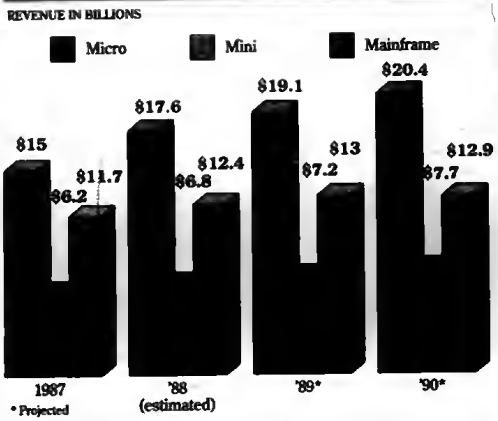
Software and services revenues, already the most robust of four industry segments measured, are expected to continue leading growth through 1989. CBEMA sees the software sector growing 11% to $66.6 billion in 1989, compared with a 15.1% rise in 1987 and an estimated 15.8% increase in 1988.

Computer equipment revenues grew 10% last year to reach $118.4 billion and are estimated to grow 11% to $131.4 billion this year. By the end of next year, CBEMA said, an 8% rise to $141.9 billion is expected.

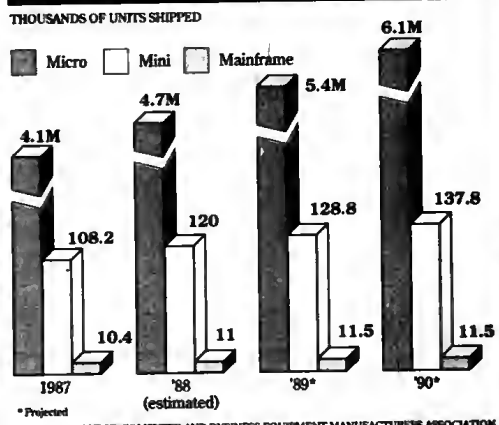
Growth in telecommunications equipment revenues slowed from 1987's 4.1% to approximately 3% in 1988; revenues are expected to increase by some 4% in 1989 to $57.5 billion. Telecommunications services growth, already down from 7.6% in 1987 to an estimated 6.9% in 1988, should decrease further to 5.4% in the coming year. That diminished percentage growth, however, will nevertheless represent a $149.1 billion industry niche.

NELL MARGOLIS

Micros should keep up-growth



. . . while large systems stagnate



SOURCE: COMPUTER AND BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION
CW CHARTS

INSIDE LINES

'Twas the season of giving and all through the yard
Not a vendor was stirring, nor even this bard

'Up, up, up!' the editor did cry
'Our readers await; our trade we must ply
Rich gossip we solemnly promise, by golly
And right now, I promise, I ain't feeling jolly'

'Please sir,' one writer did say with a bow
'It's Christmas, O master, we want to know now'
'Nay, read what my lips say,' the boss-man cooked
'These glowing reviews can be quickly revoked

'On Barney, on Daly, on Cortese and Ryan
Get back to your stations! Let's see fingers flyin'!
Go Hamilton, Brandel, go Pitts and Keefe
Go after that story like hounds with bared teeth!

'Yo, Wilder, Horwitt, yo, Savage, Margolis
You can do much more, and I really know this
Take Connolly, Alexander and, yes, Mr. Gibson
To Armonk and Maynard, your pens should be blittin'

'Call in Bouman, call Betts and, hey, call in Morgan
It's high time to show the whole world that we can'
Just then, just that moment, as the troops did assemble
A senior staff member did stand up and tremble

'If we're desperate, the cat should be freed from the bag
Let's preview for readers our January rag
You know on Jan. 9 we will print words from Ahern
Let's give a taste now just to show we're not fahern

'The IBM chair through an hour's talk did last
Examining the ghosts of IBM's future, present, past
Explaining the ways of the corporate vivisection
John Ahern's hube down on a Blue resurrection

'It takes that cold shower . . ." John A. said with knowing
"to get your blood going . . . and our blood is going'
If from IBM's pinnacle you'd like to hear
Grab our first rag'lar issue of the upcoming year

Another voice cried, 'Hey, there, boss — stop the presses!
A Microsoft rumble I've heard that perplexes
In OS/2 Extended, the source code, it seems
Has suddenly in Armonk stirred up some bad dreams

'Microsoft needs it for true compatibility
But IBM has trouble assuring reliability
In the wrong hands, it's said, IBM fears this code
Would put upstart challengers 'pon the right road'

'We're hot now; we're humming,' the boss said with glee
'I think tunnel's end now I'm starting to see
What else, now, what else,' he remarked as he tore
Through the new-bustling newsroom, out looking for gore

Hit by a bolt, our benchmark whiz smiled
'Hey, boss, my quest's skip'ry as treasure of the Nile
From DEC since July an audited report we've awaited
And here still I sit, boss, completely unsatisfied

'And now IBM with its benchmarks will show
that the 4381 and 9370 really do glow
They redid the network to robust TPS saviors
And lo and behold — performance barely wavers'

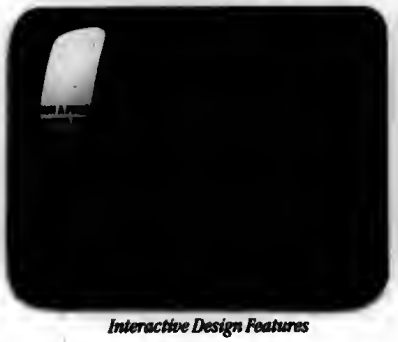
Then, like a happy Santa, the editor did sit back
No more inches to fill — finally! gifts he could wrap
'Let's call it a wrap, now, and clear out of here
Let's rest and get ready for a happy new year'

To his readers he offers a parting thought:
We hope you could see what this past year's we've wrought
We've done our job well, but still, we're not happy
We'll try to do more — and we hope this ain't sappy

Our hot line (800-343-6474 or 508-879-0700) you can call
and News Editor Pete Bartolik's staff will carry the ball

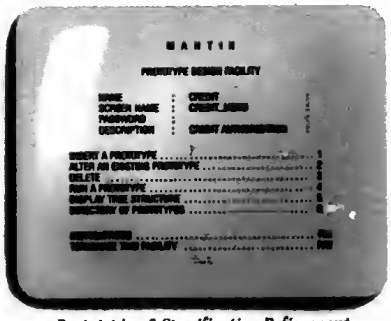
The Best CASE Tools.

Project Planning

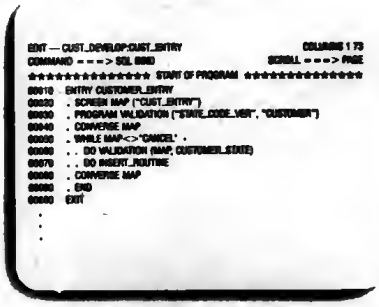


Interactive Design Features

Graphic Design Features



Prototyping & Specification Refinement



Advanced Development Languages

Interactive Documentation Management

Project Control

Electronic Mail

Project Evaluation

One Integrated Solution.

The Cincom Advanced Software Engineering Environment: the integrated solution to your CASE needs.

Use it as a complete set. Or choose individual components. THE CASE ENVIRONMENT is your superior all-purpose CASE tool kit: because it's the flexible way to make application design, development, and maintenance faster. Easier. And more cost-effective: whether you use PCs, minis, or mainframes. On IBM,® Digital,™ or other platforms. With IMS, DB2, another DBMS –or no DBMS at all.

Using advanced software engineering principles, THE CASE ENVIRONMENT combines MANTIS,® our proven development system, with a complete set of the best CASE technology tools. Together, they create a development environment for the entire application life cycle: from requirements planning through implementation and maintenance–including documentation and project management. Individually, their flexible modularity lets you build your own environment over time, using only the tools you need.

And because of its open architecture, THE CASE ENVIRONMENT integrates with tools you already have–like CASE workstations, word processors, and desktop publishers. Plus, every application you develop is portable, without change, across a wide range of platforms.

The best CASE tools: integrated. Modular. Flexible. For application development in a variety of environments, welcome to THE CASE ENVIRONMENT.

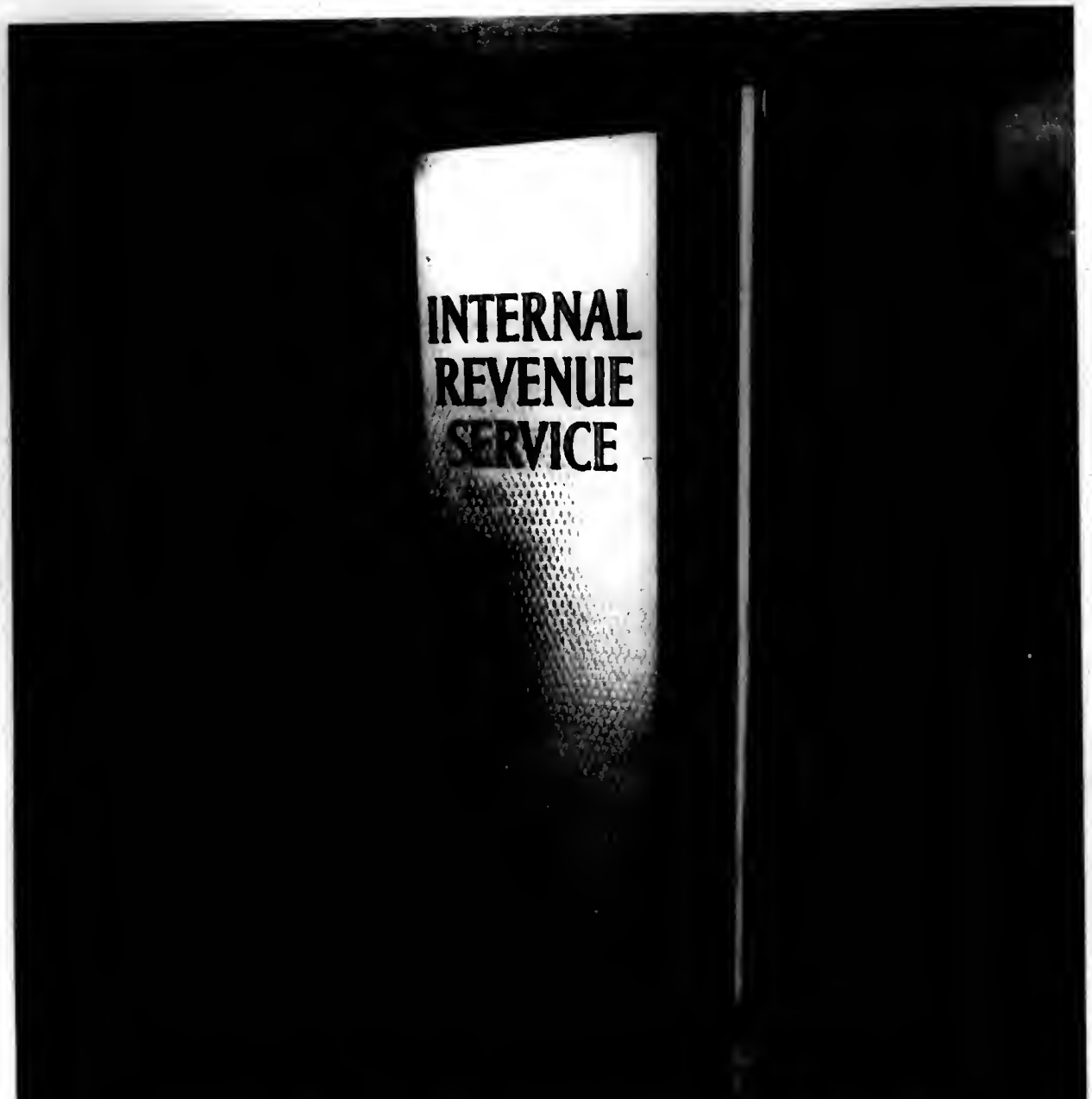
Call us today. **1-800-543-3010**

In Ohio, 513-661-6000 • In Canada, 1-800-387-5914

CINCOM®

The Better The Solution, The Better The Value.™

Digital is a trademark of Digital Equipment Corporation. IBM is a registered trademark of International Business Machines. © 1988 Cincom Systems, Inc.



OUR HUMAN RESOURCE SYSTEM MAKES SURE THIS INSTITUTION GETS EXACTLY WHAT IT DESERVES.

On January 1, 1989, when other human resource systems rolled to a halt, ours was rolling into action. Just like the new tax laws.

You see, while Congress was putting new Technical Corrections into effect, we were ready and waiting to apply solutions for section 89 discrimination testing.

That's just one of the reasons why 44% of big business, big enough to have their own packaged mainframe human resource systems, is smart enough to get its software from Management Science America, Inc.

Not only does our system pay accurately, it calculates taxes based on effective dates and produces reports and magnetic tape reporting in state and federal required formats.

Not only is the payroll correct, it is automatically integrated to benefits administration capturing contributions, wage bases, FICA wages and hours on a plan year basis.

Then there's the added dividend of MSA's ongoing maintenance program. Which pays because you'll never have to rewrite your human resource programs to comply with new or adjusted federal regulations.

For more talk about a system that's never taxing, call Robert Carpenter at (404) 239-2000.

MSA
The Software Company

© 1988 Management Science America, Inc.